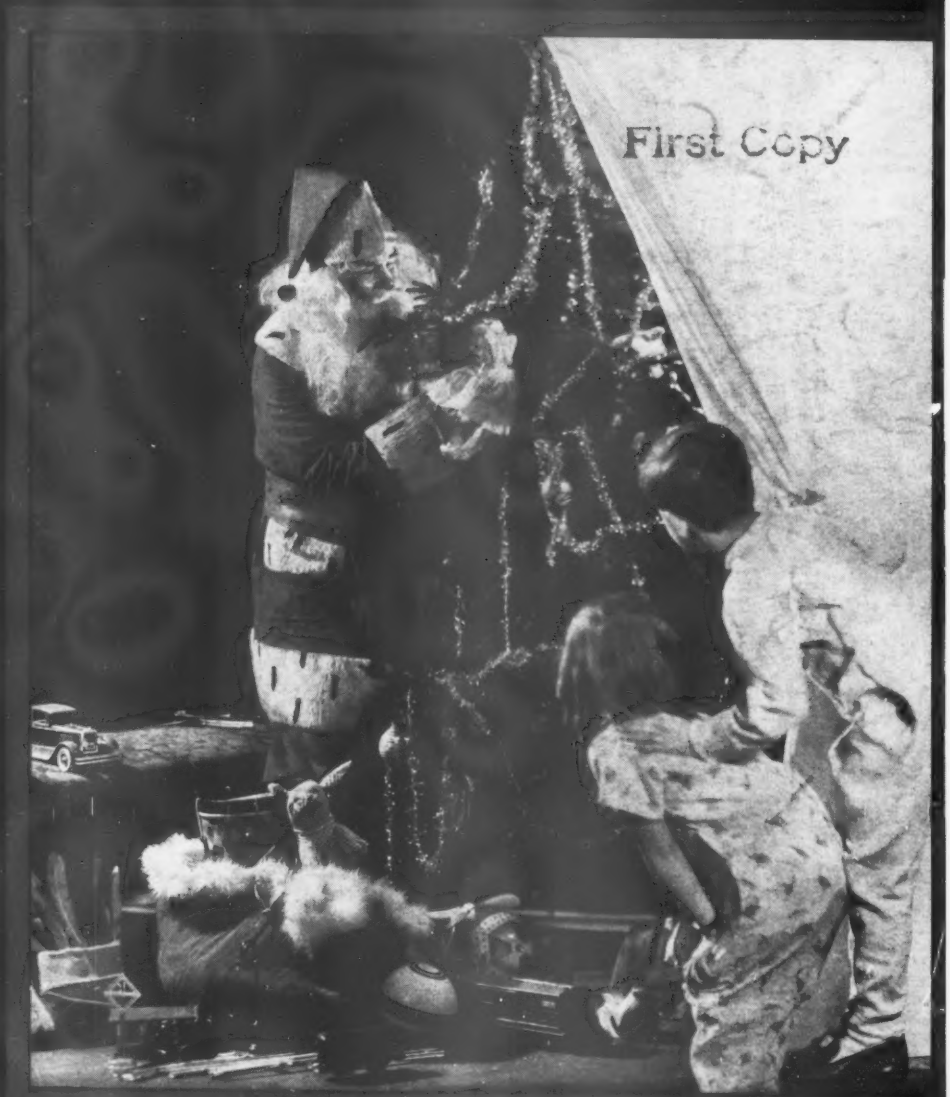
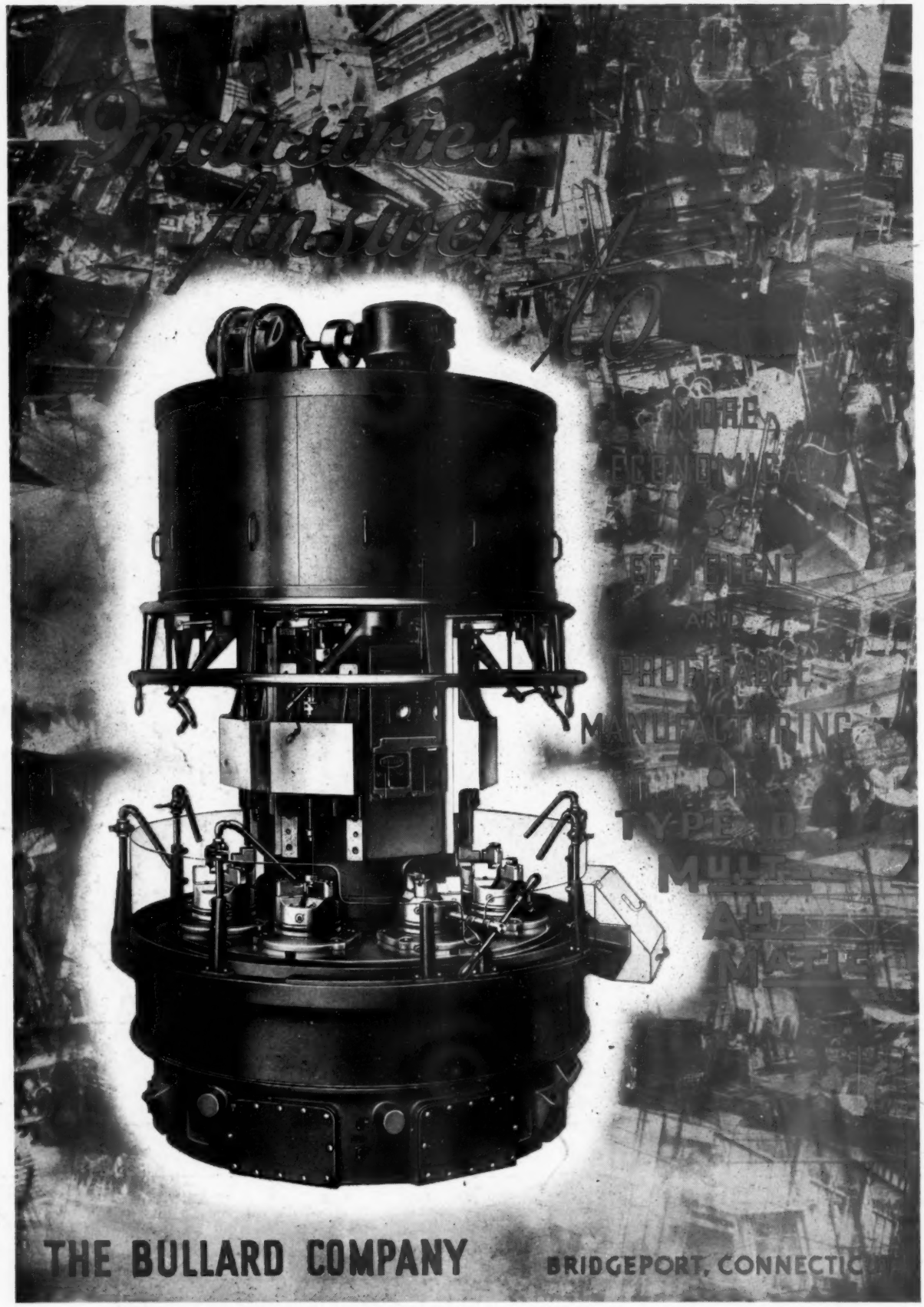
The Tool Engineer



THE TOOL ENGINEER WISHES A

Merry Christmas

TO ALL ITS READERS



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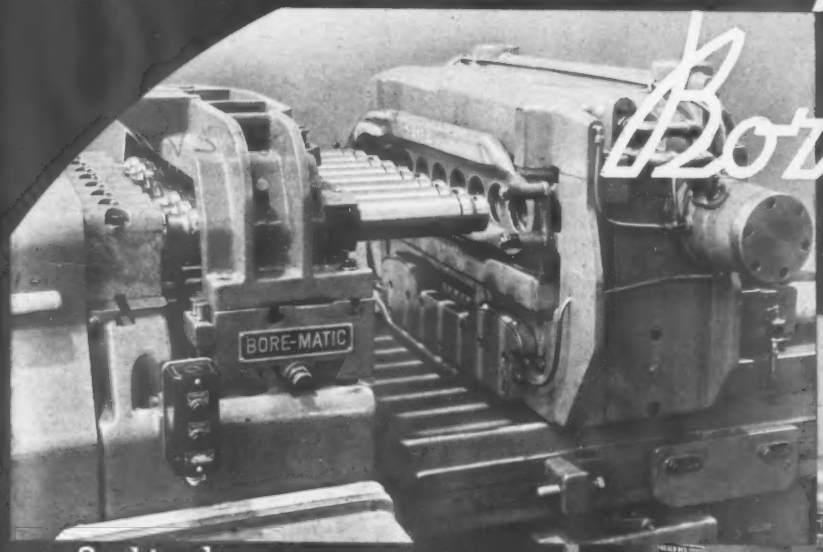
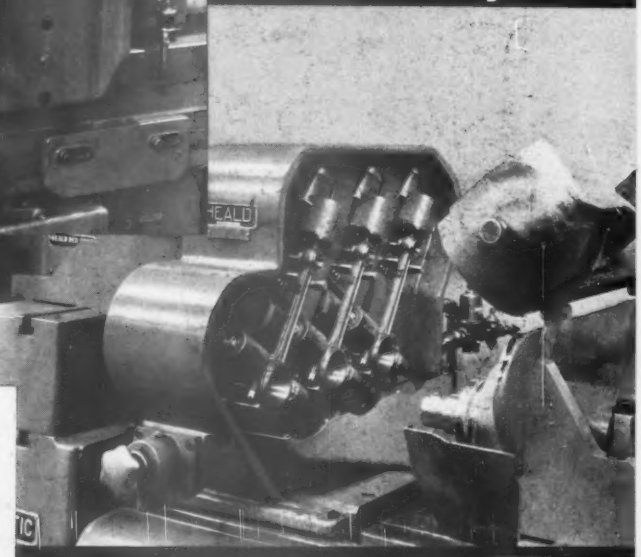


A. Cylinders

B. Connecting Rods



C. Pistons

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Official Publication of the AMERICAN SOCIETY OF TOOL ENGINEERS

Vol. V. DECEMBER, 1936 No. 8

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The Tool Engineer is published on the first Thursday of each month. It is the official publication of the American Society of Tool Engineers, Incorporated. The membership of the Society and readers of this publication are practical manufacturing executives such as master mechanics, works managers, Tool Engineers, tool designers and others who are responsible for production in mass manufacturing plants throughout the nation and in some foreign countries.

Owing to the nature of the American Society of Tool Engineers organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

Published by

THE BRAMSON PUBLISHING CO.

2842 W. Grand Boulevard MAdison 7553 Detroit, Michigan

Roy T. Bramson, *Publisher and Editor*

ADVERTISING OFFICES

Chicago, Illinois — Dwight H. Early — 100 N. LaSalle Street — CENtral 4158

Providence, R. I. — H. T. Pierik — 4 Weybosset Street — GAspee 1566

Printed in the United States of America.

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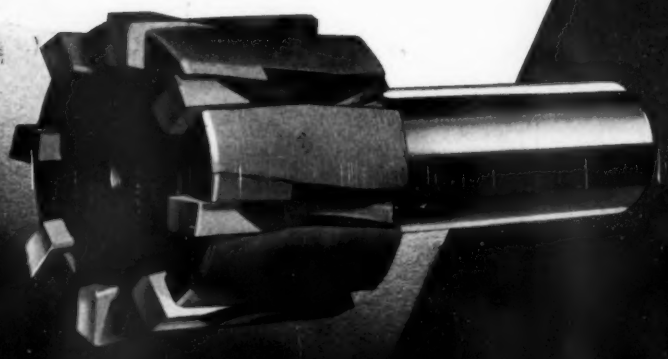

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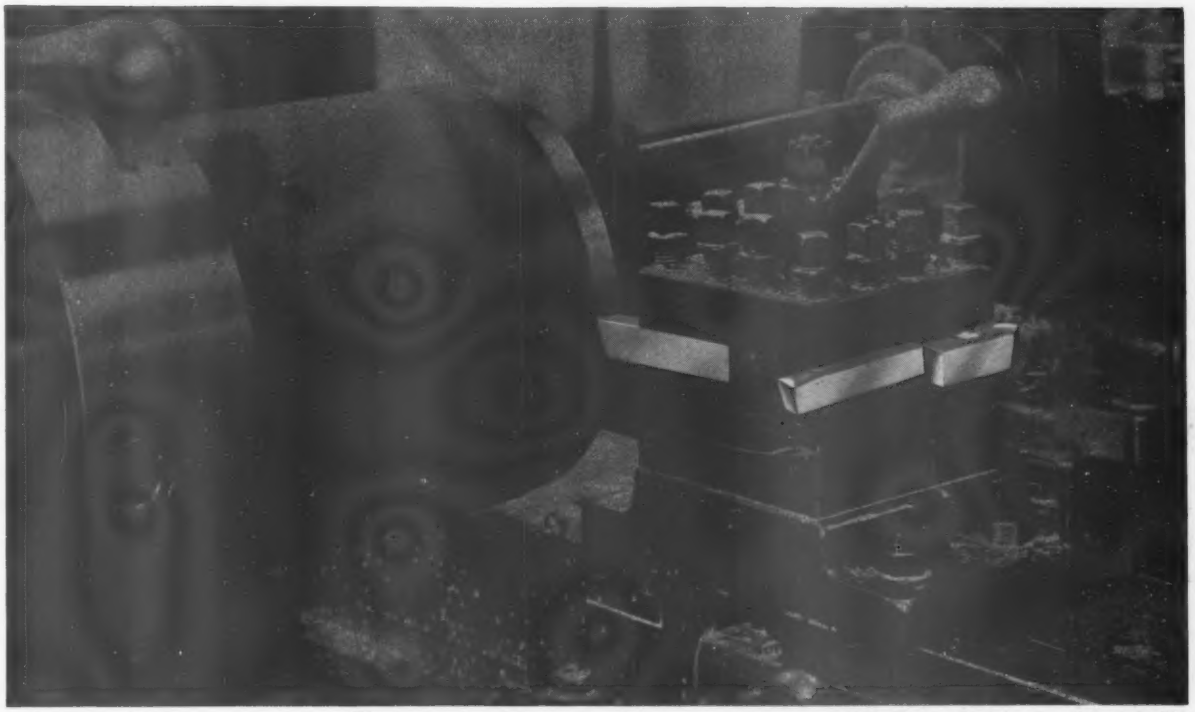

This hardened steel forging for a bearing-race is being rough-turned with a ½-in. square Haynes Stellite J-Metal bit, using a coolant. The depth of cut is ⅛-in. to ¼-in., the cutting speed is 190-ft. per min., and the feed is .009-in. per revolution. One to twelve pieces are machined per grind, depending upon the hardness of the forging. High speed steel will not machine these forgings—they are too hard.

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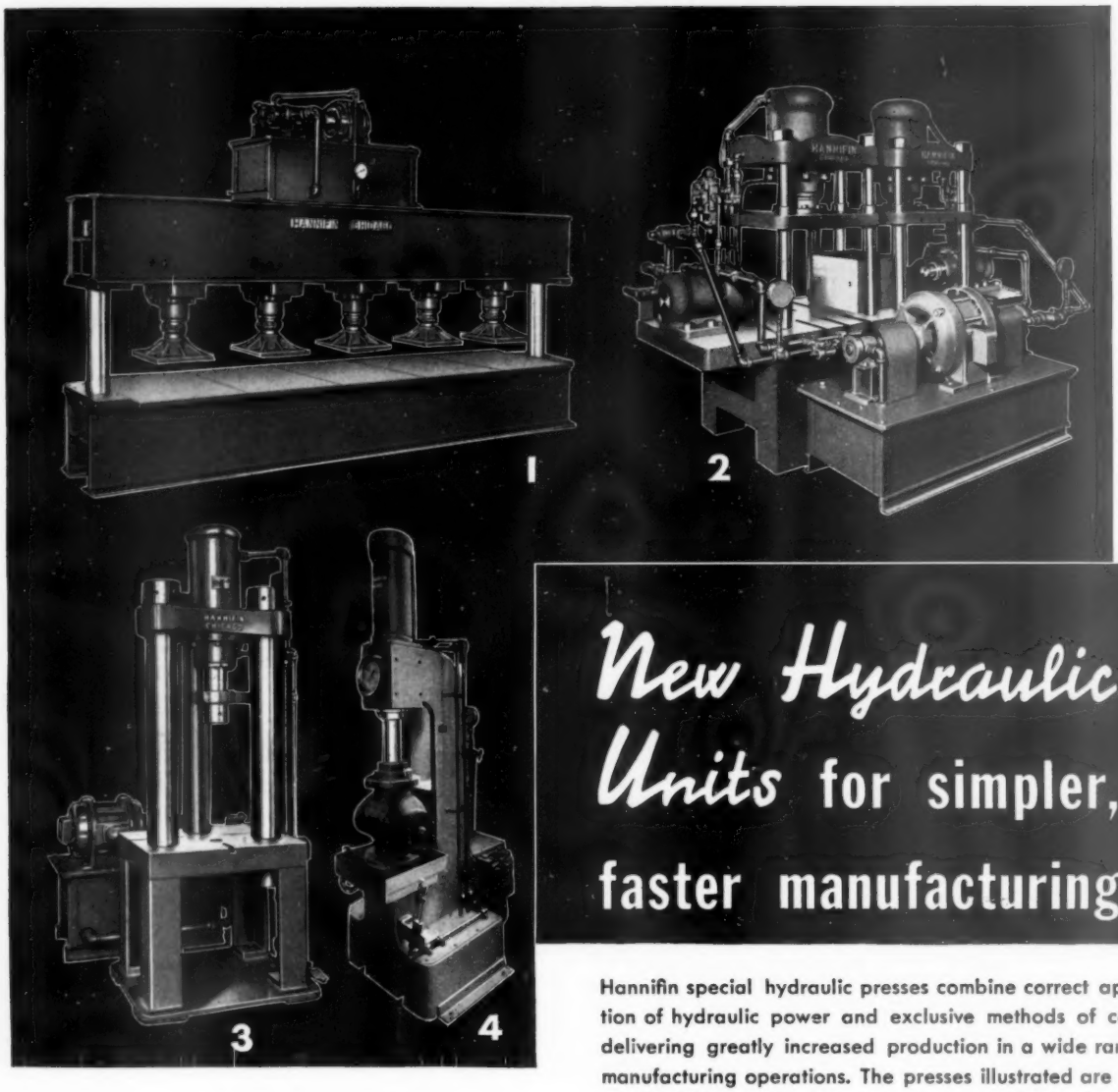

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Hannifin special hydraulic presses combine correct application of hydraulic power and exclusive methods of control, delivering greatly increased production in a wide range of manufacturing operations. The presses illustrated are representative of Hannifin design to meet individual requirements.

These hydraulic presses replace tedious and costly labor operations with high speed, accurately controlled, simplified handling, delivering corresponding production economies.

These presses are equipped with individual motor driven hydraulic power units. Simplified controls are adapted to the operating requirements of each job.

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ENGINEERS • DESIGNERS • MANUFACTURERS • PNEUMATIC AND HYDRAULIC PRODUCTION TOOL EQUIPMENT

This Machine Age

AN EDITORIAL

By A. E. Rylander

By now it should be quite evident to the person of average intelligence that the machine has proven a benefit to mankind in general and to labor in particular, yet when we could assume that this fact has been established some well meaning but short sighted reformer decides that all the evils of the times are blamable to the Machine Age. What age hasn't had its evils? Of course, it would be futile to say that the machine has not contributed to human suffering, but perhaps in no greater degree than nature herself. Like nature, it has often been cruel to the individual but benign to the species; artificially created electricity, artificial means of transportation and synthetic foods have all taken their toll, but so have the natural elements and foods. Civilization, prolonging life and making it easier, has substituted violent death for the ravages of pestilence; each, apparently, adheres to the immutable law of nature's balance.

Few inventions, eventually beneficial to society, but have been contested on various grounds; principally, perhaps, on the premise that they would jeopardize labor. Theoretically, that premise is sound; practically, it is fallacious. The engineer, designing a labor saving appliance, so called, is really creating a labor *eliminating* device. He proposes to reduce the number of workers required to produce a given unit. He realizes this, and sometimes it hurts to see men laid off as a result of improved methods, but that is his job—if he didn't do it somebody else would, and not always so capably.

Now, what about the man displaced by the machine? *What* becomes of him? Well, if times are bad, he may go looking for a job; if good, he may be shifted to another department or be absorbed elsewhere. What usually happens, however, is that reduced production costs are passed on to sales, this increases demand, increased demand in turn boosts production and the employer makes more product, thus not only retaining the worker, but providing work for other men. As an analogy, the steadily decreasing cost of automobiles broadens the market, or inversely, enables the buyer to purchase a vastly superior car for the same money. Obviously, the vast demand for automobiles is due to mass production, with its myriad machines and labor saving—or eliminating—tools and appliances. This analogy can be carried into various other lines; refrigeration, heating and air conditioning, office equipment, household appliances and what have you. Mass production and mass buying resolve into mass employment and mass wealth.

The typewriter, the adding machine, the multigraph, the linotype, the mailing machine—all these were opposed as a threat to labor, yet, they opened avenues of employment beyond the dreams of even the inventors. In addition, these inventors founded great industries, thereby vastly increasing employment rather than reducing it. One could go on, ad infinitum, refuting fallacy after fallacy regarding the threat of the machine and proving in each case that it has contributed to the spread of employment to social and cultural progress, to higher standards of living and to mass welfare, without exhausting the subject.

In direct antithesis, it can be shown that where the machine does not prevail, living standards are low and cultural progress arrested. The lot of the cotton pickers in the South is not to be compared with that of the automobile worker in the North, since a really successful mechanical cotton picker has not yet arrived. The Rust machine, so publicised, is but a replica of previous attempts. The successful cotton picker will come; when it does, the South will forge ahead. One can also consider the building trades, which have bitterly opposed the intrusion of labor saving equipment; their crafts lag far behind in the general scheme of progress. Eventually, the machine will win even in that field, to the benefit of building artisans.

Everything considered, the machine, still in its infancy, is destined to revolutionize human standards. It will reduce hours of labor (as it already has) and provide more of leisure for the masses;—the question is, how will the masses use this leisure? Well, we'll not go into that now.

PRODUCTION PERSPECTIVES

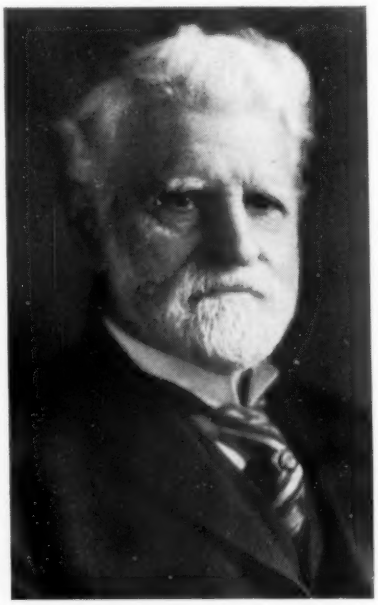
News of Mass Manufacturing From Everywhere

New England

Plant expansion activities in the Connecticut mass production field are reaching a point undreamed of within the past few years. **General Electric Co., Bridgeport,** which recently bought a large adjacent property and has completed several additions, has started two more additions at a total cost of $14,000, while **production** at its **Meriden plastics plant** will be **expanded materially** .... **Sprague Meter Co., Bridgeport,** will build two additions, both two stories .... **Abbott Ball Co.,** Elmwood, plans a one-story addition, to cost $6,900. .... **Himmel Brothers Co.,** Haven, metal products, **has bought land in** suburban **Hamden** to which its plant will be moved in the spring .... **Corbin Screw Corp., New Britain,** will make extensive repairs to Building No. 69 at a cost of $10,000 .... **A $50,000 rolling mill addition** is planned by the **Stanley Works, New Britain** .... In the same city **Union Mfg. Co.** has two small additions under way .... **Royal Typewriter Co., Hartford,** will add a third story to one of its large buildings. .... A two-story building, will be erected by **Wiremold Co., Elmwood** ....

An extra story, adding 18,380 square feet of floor space, will be built on the **Standard Plant of The Torrington Co., Torrington,** at a cost of $25,000 .... **Pratt & Whitney Co., Hartford,** will repair part of its Capitol avenue plant at a cost of $15,000 .... **Plainville Casting Co., Plainville** will add a section, to its foundry .... **Pequonnock Foundry, Inc., Bridgeport,** will add small semi-steel, alloy and grey iron castings to its line. .... **Silex Co., Hartford,** will **open a Canadian Plant** in **Ste. Therese,** 16 miles north of Montreal .... **Eagle Lock Co., Terryville,** has **increased its working schedule from 40 to 45 hours a week,** while the **Andrew Terry Co.** in the same town has **boosted wages and is building a large addition.**

Pratt, Read & Co., Deep River, has sold part of its plant to the **Electric Soldering Iron Co.** and the **Health Ray Mfg. Co.,** both controlled by L. P. Young, with **production in the two divisions scheduled to start February 1** .... **Henri Sadacca, of New York City, has bought control of The Whitney-Blake Co.,** Hamden, manufacturer of telephone and other types of wire .... **Charles L. Jarvis,** 80, founder of the Charles L. Jarvis Co., **Gildersleeve,** machine tools and hardware, and chairman of its board for the past 17 years, **died recently** .... **Russell Mfg. Co., Middletown,** has installed a 117-ton press capable of developing 2,000 tons of pressure, to be used in production of clutch-facings. The unit, formerly used elsewhere in making artillery shells, and said to be the only one of its kind in existence, will supplement presses now employed in the clutch facing department which develop but 500 tons of pressure.



Ambrose Swasey, chairman of the Warner & Swasey Co., Cleveland manufacturers of turret lathes and telescopes, has been cited by representatives of four of America's engineering societies to receive the Hoover Gold Medal "awarded by engineers to a fellow engineer for distinguished service." The medal was presented to Mr. Swasey, builder of machine tools and precision instruments for 67 years, on the occasion of the American Society of Mechanical Engineers annual dinner at Hotel Astor, New York City, on December 2. Mr. Swasey, who celebrates his 90th birthday on December 19, has devoted his life to the development of tools and scientific instruments which have been of strategic importance in the progress of production methods, navigation, military defense and astronomy. His initial gift in 1914 established the Engineering Foundation "for the furtherance of research in science and engineering for the good of mankind."

Employment in 25 metal-working establishments of Western Massachusetts **showed a further gain in October,** amounting to 874 in this instance. The total number employed as of Nov. 1 is given as 21,252, as against 20,378, on Oct. 1 and 16,351 on Nov. 1, 1935. The increase was chiefly in the electrical industry, the **General Electric** and **Westinghouse** companies being at peak points for the year. The volume of employment is not expected to show much variation, for November.

The Cornish Wire Co. of New York has **purchased a plant** in **Williamstown, Mass.** and **will soon install new machinery.** Plans call for the employment of 100 workers. .... **Chapman Valve Co.** of **Indian Orchard, Mass.** reports earning of $262,161, equivalent to $52.43 a share preferred and $1.69 a share, common. .... The **3,500 employees** of the **American Steel & Wire Co.,** of Worcester, Mass. **will receive a 10 per cent wage increase,** adding $400,000 to the annual payroll. The concern operates three plants in Worcester.... Owing to heavier production requirements in the refrigeration, fan and motor appliance divisions, about **200 have been added** to the force of employees at the **Westinghouse Electric and Manufacturing** plant **in East Springfield,** Mass. bringing the total to between 5,300 and 5,400. .... **Heavy orders** in advance of the public announcement of new models keeps the **Indian Motorcycle Co.,** Springfield, Mass. working overtime. A force of 400 is kept employed and officials say indications are that **1937 business will eclipse that of 1936** .... **An excellent run of orders for both pump and oil burner lines** has kept the employment force of nearly **1,400 intact at the Gilbert & Barker Manufacturing Co.,** West Springfield, Mass. Flood rehabilitation work has been concluded. .... A **sales increase of almost $2,000,000** by the **Wickwire Spencer Steel Co.** in **Worcester, Mass.** in the first nine months of 1936 over the corresponding period in 1935 is reported by trustees. .... **The United American Bosch Corp.,** Spring-

field, Mass., **reports increased business** in both its radio and automotive equipment departments. . . . **The Van Norman Machine Tool Co.,** Springfield, Mass., reports its issue of common stock practically sold out. . . . **A 25 per cent increase in expenditures for promoting the transformer business** of the Pittsfield Mass., works of the **General Electric Company** for 1936 is announced by **Willard V. Merihue.** He spoke before district sales representatives of the company at the second days' session of the annual transformer specialists, conference. . . . A trophy symbolic of the Westfield River Valley League championship was presented to the **Foster Machine baseball team** at a banquet at which the members of the team were guests of company officials in Westfield, Mass., November 12.

Tool making business at the **Kendrick & Davis Co.,** plant in **Lebanon, N. H.** is reported as better than last year. . . . **S. S. Frost is developing a new process for tempering cutting tools,** after a test made by the **Sullivan Machine Co., of Eastport, Me.** . . . . **Sulloway Hosiery Mills** at Franklin, N. H., is installing a new 500-horsepower electric generator and other new equipment. . . . **The Griffin Hack Saw Co., at Franklin, N. H.,** has increased operations. . . . Robert E. Earb has been chosen vice president and general manager of the **J. F. McElwain Shoe Co.,** Nashua, N. H., succeeding Major Francis P. Murphy who has been elected governor of New Hampshire.

Ohio

From **Cleveland** we hear the **Chase Brass and Copper Company is building two additions** to its present plant at 1155 Babbitt Road, Euclid, Cleveland suburb. The **Synthetic Products Company** of Cleveland has **leased 20,000** square feet in a building in the Euclon property at Euclid Avenue and London Road, N.E. The company is moving to this building, which is being remodeled, **thereby doubling its space. John C. Howe, President of the American High Speed Chain Company of Indianapolis,** has **purchased** the **Machine Products Company** at 1804 East 63rd Street, Cleveland. The Cleveland location was selected because of its better location for distribution. **The McIntosh** Merrill Machine Company of Cleveland has been purchased by the Black Boring Machine Company. Both of these companies will operate from the plant of the latter at 6701 Pear Avenue, S.W. Development work on boring machines, patented by L. G. Black, will be carried on in the new location. From **Dayton** we hear that the **Master Electric Company enjoyed the largest sales** volume during October **of any month in the company's history.** This month showed an **increase** over the corresponding month of 1935 of **122%,** while the first ten months of 1936 showed an increase in business over the corresponding period of 1935 of 50%.

Wisconsin

The **Ford Motor** Car Company **assembly plant in Milwaukee,** North Prospect Avenue at East Kenilworth Place, **will resume operations as soon as new equipment can be installed.** The plant, closed since the fall of 1932 **will employ between 1,000 and 1,200 men.** Employment of new workers will start immediately with top employment to be reached about January 1st. This Milwaukee plant will supply about two-thirds of the cars for Wisconsin. **All old equipment at this plant will be replaced.** "Barring unforeseen difficulties, the jobs will be permanent. We expect to provide year-around employment, without seasonal lay-offs," stated **W. E. Simons,** branch manager for the company. The **J. I. Case Company** of **Racine,** Wisconsin, have **received a large order** for three hundred Industrial Tractors from the City of New York to be used for snow removal, street cleaning, etc. The **Nash Motors Company** have **increased their production on Nash and Lafayette** automobiles to sixty per hour on a nine hour working day.

Letters were recently sent to stock-holders of **Nash Motors** and the **Kelvinator Corporation,** Detroit, notifying them that the directors of each had approved a merger of the companies and asking for approval of the plan from the shareholders. The plan provides for the change of the name of the proposed merger to Nash-Kelvinator Corporation. It has not yet been learned what changes will be made in manufacturing personnel or what shifts, if any, will be made in various manufacturing operations. . . . **An $850,000 order** for two large steam turbines **was recently received by the Allis-Chalmers** Manufacturing Company from the Williamsburgh Power Plant Corporation, Brooklyn, New York . . . . **Harvey B. Bower,** member A.S.T.E., has been **advanced to manager** of the Milwaukee office for Danly Machine Specialties, Inc. . . . Plans are being made to **recapitalize the Hein-Warner Motor Parts Corporation,** it was recently announced by G. G. Hein, President. New Buildings are to be constructed with the additional capital and **new equipment is to be purchased.** Mr. Hein reported that the **business** of the company **had increased 75% over last year** and that more than 175 men are now employed.

Pittsburgh District

Carnegie-Illinois Steel Corporation **announced on November** 16th a **10% wage increase** and an automatic adjustment plan which became operative in all its plants. A spokesman for the company stated that the order making the wage increase effective in all plants meant that the **annual pay roll,** for nearly one hundred thousand employees of the company, would be **increased by 15 million dollars. More than 5 million dollars** is involved in the order recently received by **Mesta Machine Company** for mill machinery to be

(Continued on page 38.)

Important Notice Regarding Correction to Data Sheet Covering Sundstrand Machine Tool Company Model No. 10 Lathe

"Kindly refer to the American Society of Tool Engineers' Data Sheet for the subject machine, particularly the view showing the drilled holes in the nose of the spindle."

At the right of this view you will see a dimension of 2⅜" radius. Kindly change this to 2⅝" radius.

Directly under this view you will see a notation No. 6 N.M.T.V. Spindle Nose. Kindly change this to 'Type A6 Spindle Nose.'

Some Rambling Thoughts on Jigs and Fixtures

By **PROFESSOR JOHN YOUNGER**
Ohio State University
Department of Industrial Engineering
As given before Detroit Meeting A. S. T. E.
November 12, 1936

In introducing the speaker of the evening, Mr. Otto Winter, Chairman, Detroit Chapter A.S.T.E. said:

"We have with us tonight the head of the Department of Industrial Engineering at Ohio State University. He doesn't need an introduction as he is an honorary member of this Society. And I want to say this about him, and he will no doubt amplify this and confirm it as he progresses through his talk as to his experiences, he is a practical man, has a world of experience, he came up from the ranks, he has swept floors and gone through both the practical training and the University training so he can give you both sides of the story here in what he delivers tonight. I want to say this, too, I might speak with a little prejudice as I am one of his apprentices, he is a real fellow, an unusual college professor as college professors are sometimes pictured. He can tell more Scotch stories than any fellow I ever saw. I would like to pit him against Andy here. The Scotch and Swedish stories are very entertaining. He knows Scotch stories as well as something about industrial engineering. He is the most popular man on the campus and I don't think that is stretching it a bit, and he mixes with the boys, he is a real fellow. So it gives me a great deal of pleasure and no small amount of pride to introduce Professor John Younger."

Professor Younger:

I am just as proud of my product as my product says he is of me, And I am proud of all the boys. I think we are doing a pretty good job down there and I hope to God the results are going to justify it. I am awfully glad to see so many men a little bit younger than I am. I am awfully glad to see men of that type here because I thought I would reminiscence a little bit. I hope it will be a source of interest to the older man and of inspiration to the younger man. During the last thirty-six years since 1900 there has been terrific progress made in tool engineering and sometimes I think that in the stress of hurry and bustle of the modern world we don't realize that progress and we ought to realize one other thing, that goes with it, if progress has been made in the last thirty-six years we have not yet stopped, we are still making history, we are still making progress and we are going to go on to a future that I don't think any of us can visualize, except it is going to be a wonderful future.

Away back in the old days, around about 1900, we didn't have tools, jigs, and fixtures. We were just about thinking about them, but not much more, and in the shop I worked in, it was a pretty fair sized shop, about three thousand, we marked off everything. Some of you men will remember the old marking off benches, where the boys, usually apprentice boys, stood with a white wash brush and white-washed the castings and forgings. (How do you do, George, I just saw you down there.) Then we took our center punch and punched away for dear life marking off the place. We did that even for a hundred pieces, sometimes we used templates. We didn't have any tools, jigs or fixtures. High-speed tool steel was just about coming in. I remember seeing my first high-speed tool steel at that time. I had rather a curious experience, if you don't mind my relating it, at that time. I was making some spring buckles and the buckles came out something like that (illustrating) and very carefully I marked off this space down here through which the Slotter worked. Some of you have never seen a Slotter, it was a great old tool in its day. I marked off these places there and away they went to the Slotter. He was darn drunk that day. When he started cutting to the lines he overdid the business and cut out the lines like that. He was a very resourceful man and took his center punch and just placing it along here he marked off some half holes. And I was blamed for the job. Fortunately, my boss was a very canny old fellow and he drew a trial line here and a trial line here and he said, "Don't worry about it, the laddie is all right." My heart gave a big jump and I felt all right after that.

We actually did have very few blue prints in those days, they were just about coming in in 1900. Our drawings in the shop came in just as they came from the draftsman. Sometimes not even dimensioned. Sometimes instead of using gauges we used to tally our job to job with a caliper, from one job to another and worked from them and finally got the job right. No gauges, no tools, no fixtures. You can hardly believe such a thing in these days. Well, along came the Boer War just about that time and in the Boer War the English people learned a lesson. They must have interchangeability in the machine gun parts. I went down to the arsenal and we started beginning the idea of working with tools, jigs and fixtures. These were the days when we had very very simple fixtures indeed. But our big necessity was the necessity for interchangeability, speed was not an element in these days at all, interchangeability was the governing factor. We did a pretty fair job, making the guns changeable in their parts. It was a great effort to get them right and there was at that time, just as now, a dearth of good Tool Engineers. It was a beginning profession. I think that you might say around about 1902 marked the beginning of the fixture engineer. Not the absolute beginning, North and Polk and those men tried it out long before that.

Then I went to another shop, one of the beginnings of our automobile shops. And in this shop we were still striving for interchangeability, but we had a man there who did not believe in having drawings for tools or fixtures, and this man was what you might call an aerial artist. He had an impediment in his speech and he would come up to the pattern maker and he would say, "Make me a pattern like this" and he would sketch the thing out in the air. Most likely it was a base plate with a couple of angle irons with a knob sticking out. That was all the information the pattern maker had, poor soul, and he would make his pattern and the thing would be cast and then not a soul in the plant would recognize the casting. We were up against it. A flock of castings and no information about them whatsoever. So the first thing that we did was to establish an idea that sketches must be produced for tools, jigs and fixtures. And that we found practically revolutionized the art of jigs and fixtures and brought it more or less, not quite, on a level with the work of the Chief Engineer. But I did learn there the importance of proper drawings and we began to make our drawings more and more elaborate and actually make blue prints of these drawings and

get them put out in the right way. In fact, I still feel that the tool print is just as sacred as the product print. In fact sometimes more.

Some of the jigs may interest you that we had in those olden days. Do any of you remember the old tong jig? It was a thing like this (illustrating)) a long handle on it like this and a box at the end and the box had a hinge joint on it here and another long handle like that and then we hollowed out this space in here and stuck in whatever we were going to do, then held it by our hands in the machine and behold the thing was drilled and turned. We used to do very funny things with it. We were very fond of jigs. We would have a base plate in here like this (illustrating) and a projection up in the air and down here something like that and we slid the piece in and took the trouble of locking it down and used a nut on the thing. It was very slow, very laborious, but I am just pointing out those things because at that time our big factor was still interchangeability.

Then I went to another automobile plant and at that time I came across the cradle type of fixture. That was a great fixture. We would take the cradle fixture and inside that cradle fixture we would lock our part and carry it very carefully from machine to machine until the final job was finished. At that time a remarkable incident happened, however. Let me tell you about that shop. I had come from a rather large shop and I walked into the building. I looked all around and said, "My God, you have a fine tool room here." And the foreman said, "Tool room, hell, that is our machine shop." A rather remarkable thing happened and that was the time abruptly around 1907, I have forgotten exactly, when Cadillac sent three cars over to England. And these three cars were run around the Brooklyn track at the speed of fifty miles an hour. A pretty fair speed in those days. And then the three were taken completely apart, disassembled and mixed up together and three new cars built from them. Those three cars circled the track at fifty miles an hour again. That was an absolute eye opener to the British as to what could be done with changeability. Cadillac received a trophy. That was wonderful in 1907. That showed how in interchangeability could be carried out to a remarkable extent.

Then I came over to this country, to Buffalo, and I think I found one of your members in charge there. He was doing remarkable things with fixtures and jigs. Speed was just then coming in. In other words, we still wanted interchangeability but we felt that with interchangeability should go speed of operation and Hans was beginning to live up to his work. That was particularly evident at the time by a visit that Frank Gilbreath paid us. Most of you have heard of Frank Gilbreath, the discoverer of motion study. He came to the plant roughly around 1914 and he noticed the idea of motion study. Everybody thought it was ridiculous to look after a man doing little things. We wanted to get on with the big stuff. But he said forget the big stuff and save time in some of your operations. He told us to pick out the job we were proudest of. We were tickled to death that the job was assembling a carburetor. The carburetor and all its parts were in one box, one carburetor to one box. A tote box is a funny kind of a thing (illustrating). You would have a bolt down here and a carburetor body up here and you have to paw through all the different parts of the carburetor to find the bolt. But we didn't know it wasted time. So Frank Gilbreath looked at that box and laughed. He said it was the most antiquated device known to man, like the Priscilla sewing cabinets your great-grandmother used. So he developed a new type of tote box, with individual compartments. But he didn't stop at that. Compartment No. 1 was for piece No. 1, compartment No. 2 for piece No. 2, compartment No. 3 for piece No. 3, and so on. To assemble the carburetor he started with piece No. 1, then piece No. 2 and so forth. He introduced rhythm into the art of assembly. We have gone further since Gilbreath's time so that man No. 1 takes piece No. 1 and so on, but that marked the beginning of the modern production system. Frank Gilbreath in assembling our carburetor in that particular way cut our time down to one-third the former time. He introduced to us the idea of motion study, and I want to jump a little bit here because I think every tool engineer ought to be familiar with what is going on in motion study today. A Tool Engineer worthy of his salt can't afford to neglect the study. Gilbreath did another thing with a rifle, practically the same thing as with the carburetor, A United States Army man in Oklahoma was the champion expert in assembling and disassembling a Brown rifle, and he would take the pieces of the rifle and toss them any old way on the table and then he would reassemble it. He would take one piece from here and one piece from over here, but he was the champion of the job. Gilbreath said, "I would like to tackle that job." He set up a special tote box and he encouraged the habit of always picking out piece No. 1 first, then piece No. 2 and so on like that. He reduced the time to one-half what it had been.

Gilbreath then developed the slow motion picture camera in which he drew people at work and studied them. He had a clock in the foreground and took the time of the individual doing the work, going slowly like this and watched how the hand moved and whether it moved along a perfect path. We have improved on the Gilbreath idea today with the latest thing in motion picture work. The ordinary camera that we have we project films at the rate of sixteen frames a second. Nine hundred and sixty per minute. Some genius, I am not sure who it was, said, "Why nine hundred and sixty, let's make it a thousand." It is not very much of a jump from nine hundred and sixty to a thousand. Today we take them at the rate of one thousand per minute and then we take the film and look at it and we can see exactly the time of start and finish and calculate to a thousandth of a minute. But that isn't the most important part of the work. In the normal motion picture camera you have a reel here and a reel here and you run from one reel to the other winding the thing up, and you get a long picture and it never repeats itself. This man took the reel and the film and caused it to loop around the circle and shows that loop over and over and over again. I sat in with the foremen of a plant in Bridgeport, Connecticut, and they ran this reel over and over again and the foremen sat around and they would say, "Why does that man have his tote box so far away? Why is he making the motion

(Continued on page 18.)

A. S. T. E. CHAPTER NEWS

Bridgeport

To charter and install A.S.T.E. chapters in Bridgeport and Hartford, Mr. Ford R. Lamb and C. Ray Brunner left Detroit, November 11th, bound for Bridgeport. Upon arrival, these men were shown through the Bullard Company plant. The organization meeting of the proposed Bridgeport Chapter was held in the Stratfield Hotel the evening of November 12th. More than fifty Bridgeport engineers and production executives were present for the dinner and preliminary ceremonies.

Following the dinner an interesting motion picture film was exhibited through the courtesy of The Bullard Company. Mr. Ben Page, of the Bullard Company, had carried on the preliminary negotiations with national A.S.T.E. Headquarters in Detroit, and introduced Mr. Lamb, National President of the Society. Mr. Lamb spoke at length regarding the aims and history, the benefits and the future of an organization such as the A.S.T.E. A number of questions were asked from the floor and these were answered by the representatives of the Society from Detroit.

An election of Chapter Offices was held with the following results: Mr. Floyd Petteys, of the Consolidated Ashcroft Hancock Company, was elected Chapter Chairmen. Mr. C. A. Dundore, of the Underwood-Elliott-Fisher Company was elected Chapter Secretary. Mr. George Wellington of the Singer Manufacturing Company was elected Chapter Treasurer. Mr. John Bullard was appointed Chairman of the entertainment committee. The Secretary and Treasurer of the newly formed chapter were then presented with their books and other implements and instructed in the duties of their new offices. Thirty-five membership applications had already been sent to Detroit and during the course of the evening an additional ten more memberships were received.

Great satisfaction has been expressed by the National Officers who made this installation in Bridgeport. An excellent start has already been made for a good strong group of A.S.T.E. in this important industrial city. Much credit for the successful culmination of the undertaking goes to Mr. Ben Page of the Bullard Company who contributed so much of his time and effort to see the formation of this chapter to a successful conclusion.

Chicago

Chicago Chapter's first regular meeting was held November 9th at the Greamere Hotel in Chicago. While several preliminary meeting had been held, this was the occasion of the formal installation and presentation of the Charter. Mr. Ford Lamb, President of the Society was introduced by Franklin W. Creager of the Chicago Screw Company. Mr. Lamb explained at some length and in detail the workings, the purpose, the aims and ambitions of A.S.T.E. He also told of the control of the national body, type of members who have founded and helped to build up the Society, the costs, benefits, etc. Following this an election of officers for the local group was held—with the following results: F. W. Creager, Chapter Chairman, M. A. Blu, Sears, Roebuck Company, Vice-Chairman, W. T. Wilson, Chicago Screw Company, Secretary and E. F. Backner, Chicago Molded Products, Chapter Treasurer.

Following the election of officers a formal presentation of the Charter was made by President Lamb, followed by installation ceremonies and presentation of the books and other implements to the respective officers.

Mr. Ed. H. Johnson of Packard Motor Car Company, Detroit, who accompanied Mr. Lamb to Chicago gave an unusual and interesting address on "Personality Selling."

Cleveland

R. E. W. Harrison, Vice-President of the Chambersburg Engineering Company, Chambersburg, Pennsylvania, was the speaker at the October meeting of the Cleveland Chapter A.S.T.E. Mr. Harrison began his discussion by comparing Drop Forging practices in this country with those of Europe. Costs in European countries are higher because of lighter weight equipment and a lack of continuity in operations. He mentioned also the definite trend toward greater accuracy in drop forging in this country, and stressed the cost of the *ultimate* piece—rather than the cost of the *individual* piece. "Good drop forging practice is the production of forgings which are true to die with a minimum of flash; top and bottom halves matching in perfect alignment, grain-flow so disposed that physical characteristics are the maximum obtainable with the metal used, and the production of the forgings without cold shuts, laps, or seams in the minimum of time."

Commenting on his observations of drop forging plants in this country, Mr. Harrison, pointed to the lack of cleanliness in the shop and also a lack of real modern equipment. "The performance of forging equipment," Mr. Harrison stated," is only as good as the dies in the machine."

Among the facts brought out by the question and answer session following Mr. Harrison's address were the following:

It is possible to have an adjustable stroke for board drop hammers, but it is hardly advisable as it would not be used on many jobs.

You cannot set any rule for tolerances on forgings as some require more tolerances than others.

The difference in parts made on board drop hammers and steam drop hammers is a matter of physicals.

It is impossible to establish a relation between the cost and the weight of a finished forging, in other words a cost per lb. basis.

A steam drop hammer is a vertical steam engine. The action of the ram is under the control of the operator at all times. In a board drop hammer the ram is lifted by bringing two rolls, one power-operated, together; it then drops by gravity, depending entirely upon its weight and its velocity at the moment of impact. Its velocity is predictable and constant regardless of the action of the operator.

The November 17th meeting was very well attended with Mr. W. H. Oldacre, the speaker. He gave an interesting talk on cutting oils as applied to modern

production. He illustrated his talk with slides and a special testing machine, in which he tested three different oils.

The Cleveland Chapter membership committee reported fifteen new members. There is a definite growth and increasing interest in the Cleveland Chapter. The December meeting will be a Christmas party to which the ladies are invited. Many surprises are promised.

Detroit

Detroit's November Chapter meeting was well attended, although the crowd was not as large as had been anticipated. Many were unable to attend because of busy conditions in plants and considerable overtime. The speaker was Professor John Younger, whose interesting discussion of Tool Engineering with rambling thoughts on Jigs and Fixtures and reminiscences going back some forty years is reprinted elsewhere in this issue. An exceedingly lively and interesting question and answer period followed the Professor's talk and a number of very worthwhile points were brought out.

Arthur Fors, brother of Director Bill Fors, has been made G. M. of Airtemp, Dayton — Chrysler subsidiary. Walter Kasturski until recently connected with Snyder Tool & Engineering Company has joined the John E. Livingston & Company in the capacity of Sales Engineer. Harold Johnson of Cadillac Motor Car Company succeeds R. (Bob) Blackington, who has retired, as Master Mechanic. A.S.T.Eer Ivar G. Eklund is now ensconced in large new quarters for his Engineering Department at Midland Steel Company. A new lobby and a new cafeteria are other features of the increased new facilities of this plant.

Hartford

Ford R. Lamb, National President and C. Ray Brunner, National Secretary, who installed and chartered the newly formed Chapter in Bridgeport on November 12th found it a particularly pleasant duty to perform the same ceremonies for an A.S.T.E. Chapter in Hartford, Connecticut the following evening. After being shown through the Consolidated Ashcroft Hancock Company plant in Bridgeport the morning of November 13th, the National Officers were driven up to Hartford by Mr. Floyd Petteys Chairman of the newly installed Bridgeport Chapter.

The organization meeting of the Hartford engineers was held in the State Trade School auditorium. This meeting was held November 13th and was called to order at 8:00 p.m. Mr. Lamb gave an outline of the A.S.T.E. history, aims, future and benefits. A number of questions were asked from the floor and answered by the National representatives.

An election of the Chapter officers resulted as follows: Mr. A. H. d'Arcambal, Pratt & Whitney Company, forsometime a member of A.S.T.E. and well known to Detroit A.S.T.Eers whose meeting he addressed sometime ago, was elected Chapter Chairman. Mr. F. I. Woodcock of the Pratt & Whitney Aircraft Division was elected Chapter Secretary and Mr. Henry I. Moore of the Firth-Sterling Steel Company, Chapter Treasurer.

Mr. d'Arcambal, as Chapter Chairman, was presented with the Charter and the other officers with the various tools of their offices and instructed in their duties and the routine of Chapter affairs. After a short talk by Mr. d'Arcambal the meeting was adjourned at 11 p.m.

All members and friends of A.S.T.E. join in wishing the Hartford Chapter every success in their newly formed branch of A.S.T.E. Some indications already point to a membership in this chapter rivaling other older and larger chapters. Particular appreciation of the effort of Mr. d'Arcambal and his friends and associates is expressed for their work in effecting the organization of the Hartford group.

Milwaukee

The Milwaukee Chapter is stepping ahead with 26 applications for membership obtained between the October and November meetings.

The elected officers of the Milwaukee Chapter—Messrs. George Smart, Art Johnson and Julius Riedl were guests at an organization meeting in Chicago to form a Chicago Chapter of the A.S.T.E., Monday evening, November 9th.

Milwaukee meetings have attracted many out of town visitors, some of whom have been admitted to membership. Present at the November meeting were Herb C. Senkbeil, member A.S.T.E. and E. A. Winter, Tool Engineers at the Globe Company. Sheboygan, Wisconsin, manufacturers of Juvenile Vehicles and General Stampings. The Globe Company, by the way, claims the distinction of engineering the design of the "Aeroflight Coaster Wagon."

We missed A. T. Kane, member A.S.T.E., Engineer with the Northwestern Engineering Company, Green Bay, Wisconsin at our November meeting. Milwaukee Chapter meetings have also been attended by visitors from Fond du Lac and Waukesha.

Racine

The regular monthly dinner meeting of the Racine Chapter, American Society of Tool Engineers, was held Monday evening, November 9th, at 6:30 P.M. in the main dining room at Hotel Racine. It was well attended by the local engineers and their guests as well as by Tool Engineers from the adjacent cities of Kenosha and Milwaukee.

The main speaker of the evening was A. F. Anjeskey, General Manager of the Cleveland Electric Tramrail, a subsidiary of the Cleveland Crane and Engineering Company of Wickliffe, Ohio, who spoke on the subject "Materials Handling."

He stated in his talk that every installation of material handling machinery of any kind has an important bearing on other tools, machinery and processes used in the manufacturing of a product and that large and small plants alike are affected to the same degree when it comes to material handling problems.

He started his talk by pointing out the great number of improvements that had to be made in the design and construction of the steel sections that carry the loads in order to hold the wear of these sections and friction of the traveling wheels to a minimum. He illustrated his talk by showing slides covering installations of overhead material handling equipment from simple hand hoists to large electric cranes, special conveyors, automatic, mechanical and hand operated, for every conceivable kind of industry such as automobile, machine shop, foundry, steel mills, mining, laundries, dairies, bakeries and sugar warehouses. In connection with the showing of these slides, he was ably assisted by A. F. Carls, the territorial Contact Engineer of this concern.

A discussion was held after the talk during which Mr. Anjeskey answered a number of questions asked by the engineers.

New Equipment

No. 10 Reed-Prentice Full Hydraulic Plastic Injection Moulding Machine

This new machine has been designed by Reed-Prentice engineers after long research in cooperation with many of the foremost plastic engineers. In output, quality of work, freedom from complications and breakdowns, it is claimed that this machine offers much more than has heretofore been available.

Some of the features of this machine are: estimated shots per hour—up to 400, varying with type of part 500 c/in moulded material per hour, 24 lb. per hour; maximum pressure per sq. in. on material — 20,000 lbs.; pressure adjustable, 2000 to 10,000 lbs. per sq. inch; maximum injection area of mould capacity—24 sq. inches; diameter of plunger—1¾ inches; stroke 6¾ inches; pressure regulating valve; approximate power consumption for heating unit—0.5 to 1.5 KWH; size of die plates—18″ x 20″; capacity of feed hopper—20 lbs.; space between bars—12″ x 12″; die opening—8″; maximum die space—12″; minimum die space—4″; diameter of tie bars—2½″; weight, approximately—7600 lbs.; oil pressure—1000 lbs. per sq. inch; motor recommended—5 HP 1200 RPM; base area—72″ x 30″, and floor space—11′6″ x 3′.

Standard equipment to include 1000 lbs. Vickers Hydraulic Pump with valve control and electric heating unit including rheostat for heat control of material. Arrangement made on heating unit for using thermometer or thermocouple—automatic counter can be supplied on special order. Machine operated manually and automatically—when manually it is operated with 2 levers, the first for closing the mold, the second for operating the horizontal plunger.

On the fully automatic machine two timing control units are furnished, one for the period for the material to solidify and one for regulating the time the molds are open for ejection of castings. These timing units can be adjusted from zero to 32 seconds.

Other features of construction include positive toggle mechanism rigidly locking the molds mechanically and not depending on hydraulic pressure to hold molds closed. Hydraulic pressure is used to open and close molds *only* and to operate plunger cylinder. Machine is operated by but one pump driven through 5 HP 1200 RPM motor. Base of machine acts as oil reservoir for hydraulic system making machine self-contained.

Large Farrel-Sykes Gear Generators for Soviet Russia

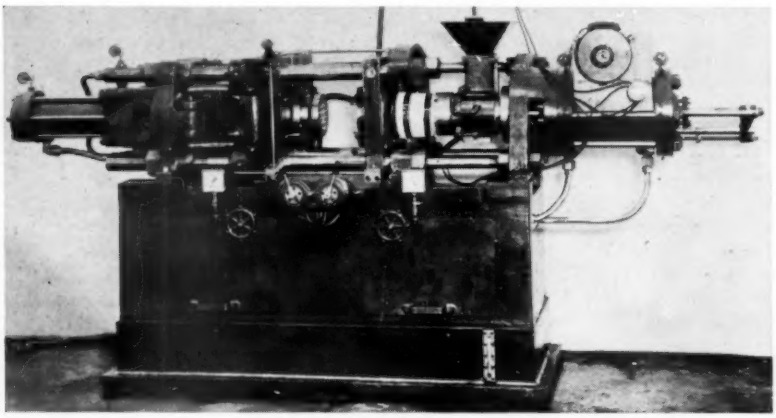
Two large plants have been established in Soviet Russia for the manufacture of heavy machinery, one of them at Kramatorsk near the Dneprostroi project in the south, and the other, known as the Ural Machine Works, in the north. Both these plants are equipped for manufacturing heavy equipment and the Kramstorsk plant is especially designed for building the heaviest steel rolling mill machinery.

In planning the production of heavy gearing in these plants, it was realized by the Soviet officials that the latest and most highly developed heavy gear cutting machinery was essential for producing high quality gears now used in high speed rolling mills, especially in the new type of continuous sheet mills.

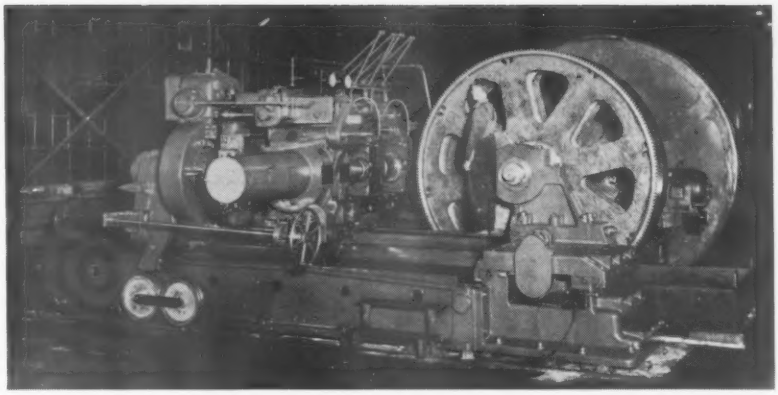
Therefore, in 1934, a group of engineers was assigned to investigate in the United States the types of gear cutting equipment available. As a result, a contract was placed with the Farrel-Birmingham Company, Inc., of Buffalo, N. Y. for two Sykes machines. These machines are of a similar design to six others made by the Farrel-Birmingham Company for use in its own plant at Buffalo but they are considerably larger, the one intended for the Kramatorsk plant having capacity for cutting gears up to 8 meters (approximately 26 feet) in diameter, a maximum face width of 1½ meters (about 5 feet) and a maximum pitch of 50 module (6.18 inches circular pitch). The machine for the Ural Works is exactly the same except its diameter capacity is 6 meters (approximately 20 feet).

These gear generating machines, one of which is illustrated in the accompanying photograph, represent the latest development of Farrel-Sykes machines and embody many recent improvements designed to obtain greater precision and facility of operation. They are capable of cutting practically every known type of gear that operates on parallel axes, including straight tooth gears, single helical gears, double helical or herringbone gears made either with continuous teeth or with a wide or narrow gap between the right and left-hand helices. In addition they will cut internal gears with either straight or helical teeth.

Besides the large diameter capacity they are also capable of cutting pinions of small diameter without any additional attachments. The hole in the main spindle is over 30″ diameter so



Reed-Prentice newly announced Plastic Injection Molder



One of the two large Farrel-Sykes Gear Generating Machines recently built for Soviet Russia. This machine will cut gears weighing up to 50 tons, up to 26 feet diameter, 5 feet face width and over 6 inches circular pitch.

that pinions made integral with shafts can be cut by passing one end of the shaft through the hole in the spindle and the other end through the outer support bearing, which has a diameter of slightly more than 32". Facilities for cutting such large pinions integral with shafts are necessary because rolling mill pinions are almost always made in that way.

The total weight of the 8 meter machine is approximately 265,000 pounds. The weight of the spindle carrying the cutter operating and controlling mechanism is slightly over 35 tons. To transport this machine from the Buffalo plant of the Farrel-Birmingham Company to the ship at New York City required five railroad cars which were all loaded almost to their limit. The total gross weight of the machine is 295,000 pounds and the overall dimensions are approximately 38 feet long by 26 feet wide.

Five motors are provided on the larger of the two machines. The 40-horsepower main driving motor is mounted on the main saddle of the machine to avoid the necessity for long driving shafts. A 10-horsepower motor rotates the work and the main spindle during the setting-up operation. A 5-horsepower motor is used for the quick traverse of the main saddle along the bed. A one-horsepower motor is used for moving the outer work support since this piece is too heavy to move conveniently by hand. A 3-horsepower motor drives the two coolant pumps, both being connected to the same motor.

The electrical control equipment is designed especially for convenience of operation. There are push button stations for starting, stopping and jogging the machine, as well as for varying the speed of the main motor. Included with this equipment is a tachometer dial which shows the cutting speed and the number of hours the machine has been operated. An ammeter registers the current consumed. A third push button station provides for starting and stopping the coolant pump and a fourth for moving the saddle along the bed in either direction. For turning the main spindle during the setting-up operation, there is a push button station that provides forward and reverse rotation as well as four different speeds. A red light glows automatically if the coolant supply fails. Limit switches prevent over-traverse of the main saddle and of the outer work support. All the electrical control equipment is located conveniently for the operator.

In addition to the gear cutting machines and a complete set of cutters for them, complete cutter making and testing equipment was supplied for each of the two plants. This included a complete set of Sykes gear tooth comparator equipment.

The unusually large size of cutting tools used in these machines is noteworthy and they are probably the largest gear generating tools thus far made. The finer pitch tools weigh 140 pounds each, and the largest approximately 400 pounds each. It is expected to use these machines for cutting gear wheels weighing as much as 50 tons.

These machines have been especially designed to meet the requirements of the Soviet engineers and they have occupied eight engineers and draftsmen for more than a year. The actual manufacture of the machines and cutter making equipment, together with the cutters, has taken about fifteen months.

Although gear cutting machines have been made before that have had as large a diameter capacity, there is no record of any having been made with as large a combined diameter, face width and pitch capacity. On this basis the larger of the two machines is considered to be the largest gear generating machine in the world.

Soviet Russia to Double Automobile Production Facilities

Soviet Russia's automobile and truck production capacity is to be doubled during the coming year or two, according to Stanley Shaw of Michigan Tool Company who has just returned to the United States after six months in Europe, the last three months of which were spent in a survey of industries in Russia.

This increase will provide a daily production capacity of 500 passenger cars and one thousand 1½ ton trucks at the Gorky plant. According to Mr. Shaw the Gorky plant at present employs some 23,000 men and women and is remarkably efficient in its operation. In this respect he says the plant compares favorably with many plants in the United States. A great deal of this is attributed to the outside viewpoints available in the management and organization of the plant and the extensive educational program for the men in the shop. Mr. Shaw estimates that approximately 15,000 of the present employees are being schooled as specialists in tool design and manufacture, die making, metallurgy, drafting, and factory management, etc. Instruction is carried on at the expense of the government and wages are paid during school hours.

Mr. Shaw also attributes the remarkable growth in efficiency to two other major factors. The first of these is the complete abandonment in Soviet Russia of the hourly wage in favor of the "merit" system of compensation, an interesting development in view of the fact that the merit system is generally opposed by some labor elements in the United States, in favor of an hourly rate.

The second efficiency factor is the use in Russia of only the very

(Continued on page 40.)

On Jigs and Fixtures

(Continued from page 13.)

with his arm that way?" And then they went out to the plant and corrected those things and they worked on tote boxes and fixtures particularly and they were able to eliminate little useless motions and in so doing create products at less cost. Now we have to do that these days because we are dealing with such small labor sums of a product. The cost of labor on an automobile is very small. The labor cost on a radio is about $1.74. Incidentally there was a firm of efficiency engineers went down to the Bridgeport plant and they said, "We can save $1.00 here and $1.00 there." "Hold on," the manager said, "The whole thing costs $1.74 where are you going to get your dollars from." Those things are coming in motion study and should be studied. The stop watch, I think, is becoming an obsolete article, the motion study camera of the one thousand frame per minute type is going to take its place. Time study and motion study will be linked together in a few years time and you won't distinguish one from the other. The other thing coming in is the principle of simulation. It has been started by the Bullard Machine Tool Company, also of Bridgeport, a very interesting principle indeed. And I think you could get an idea of it if you think of the old one-man band. You don't see them any more, thank God, where the fellow played the concertina and had a bass drum on the right foot and a trap drum on the left foot and a mouth organ in his mouth. I don't know what he did with the rest of him. He was making some kind of music with all the facilities that the Lord gave him, and doing a pretty good job too.

This story was told me by Frank Gilbreath and I don't know whether it was true or not. An old lady in Switzerland was seated on a rocking chair and she was operating a churner with her right foot churning good butter. She was rocking a cradle with her left foot, and knitting with her hands and reading a newspaper simultaneously. Emerson remarked, "At last I have found a woman who is 100% efficient." But Gilbreath said, "No, she is only 80% efficient, she might be seated on a cheese pressing the cheese down. Now, those may seem like far-fetched stories, but there is a grain of truth in them. Today we utilize more and more the facilities and capabilities and all that of the human being so as to get work done at less and less cost, and we have to design fixtures for that. If you don't mind me introducing the Bullard Machine Tool Company again, I think that idea is expressed wonderfully in the Bullard Multi-Matic where you have the big rotating table like this (illustrating) and you have the little rotating tables like this. And you have a man stationed down here and he is loading and unloading the machine. He loads on to a fixture here and as soon as it is loaded the fixture travels to the next position for the next operation and then travels on to this position for the boring operation, and so on around the different cycle of operations. The man is simply a feeder of the machine, and the machine tool and fixtures are doing all the work and they are doing it simultaneously and in harmony. In the old days not so long ago we did work this way (illustrating). Step by step. Today we are getting to the point where we do work this way, and the cost of doing that work is this and the cost of doing it the old way is away out to Toledo.

Well, at that time the economics of tooling was coming in. We didn't feel that we should have inexpensive fixtures. At that time we were spending a lot of money on fixtures and we were getting pretty good results. But we began to think that there was an economic side to jugs and fixtures. The long run and only the long run would justify expensive fixtures and the short run inexpensive fixtures, and then we started the idea of looking out for expensive materials on the one hand and inexpensive materials on the other hand. That was the time when we started the use of aluminum fixtures with steel facings on them, and it was the same time also when we started the idea of simple little wooden fixtures with perhaps steel facings or none at all. And, by the way, wood makes an excellent material for use in fixtures. In automobile body work you use it very extensively.

There was another problem that engaged us at that time and I don't think it has been settled yet, and that was the specialized tool versus the standardized tool. Maybe it has been solved, but I don't think so. I can best illustrate that by a manifold coming down like this (illustrating) in which two flanges on the same plane and another flange in a different plane. You can get a machine tool with two vertical spindles cutting into those two planes there and with an inclined spindle cutting into that plane and one cut will solve your problem, remove the necessary material and give you the manifold as you want it. Or you can lock this in a cradle fixture and you can feed this cradle fixture so far, machine off this plane here and then rock the cradle fixture on its trunnion, machine off the inclined plane and rock it back again and machine off the other. In one way you have a specialized machine tool which might cost anything from $6,000.00 upwards. In the other way you have a machine which will cost you about $5,000.00. But if you change your manifold at the end of the year you only have scrap value for the machine left, whereas if you change your fixture you have a $4,000.00 machine still left. You have lost your fixture. Those are problems that we still have to answer.

Now, there is a human element in fixture designing. These are just a few random thoughts. And this human element is very important. I have seen men take expensive fixtures, and I guess you have too, and just with one sweep of the hand throw the darn thing on the floor and never think anything of it. And you have seen men take a fixture that you thought was scientifically designed and absolutely perfect, with a jig plate on top of the thing and a nice row of ⅜ bolts up on the surface. And the fellow would take his wrench and he would look at those ⅜ bolts and he wanted them tight and give a whale of a big tug on the end of the wrench and he would strip the threads. I think engineering starts with a ⅝ nut, I am not quite sure. Of course, we have our modern high tensile steels and so forth, but still I think in engineering fixtures work should start at ⅝ nut if you can have it. In our Buffalo plant we had trouble with our timing gears. Trouble often goes in rather curious ways, and every now and then we would have trouble with our timing gears and would get it corrected and so on. But this time

(Continued on page 22.)

PATENTS

RIGHTS OF PARTIES — EMPLOYMENT CONTRACTS

Eighth in a series presenting a concise, informative guide on the subject of patents.

By EVERETT G. WRIGHT
Patent Attorney
Detroit, Michigan
Member of the Michigan and Federal Patent Bars

A reissue patent is granted when the original patent is inoperative or invalid by reason of a defective or insufficient specification, or by reason of the patentee claiming as his invention or discovery more than he had a right to claim as new, provided the error has arisen through inadvertence, accident, or mistake, and without any fraudulent or deceptive intention. No new matter may be introduced into a reissue specification. Reissue applications must be made and the specifications sworn to by the inventors if they be living.

A disclaimer may be filed when a patentee, through inadvertence, accident, or mistake, and without any fraudulent or deceptive intention, has claimed as his invention more than he had a right to claim. Claims once disclaimed cannot be presented into another application by the same inventor.

Purpose of Interferences

An interference is a proceeding within the Patent Office to determine which of two or more applicants claiming the same patentable invention is in fact the first inventor thereof, or, if a patent has already issued to one of the applicants, whether or not another patent should issue to the other applicant if he in fact is found to be the first inventor.

Interference Procedure

Interferences are *inter parte* proceedings before the Examiner of Interferences under whose jurisdiction the priority of inventions are determined. The procedure is extremely technical in its nature and similar in many respects to that of a law suit and should be handled by competent patent attorneys.

In interference cases the parties have a remedy of appeal from the decision of the Examiner of Interferences to the Board of Appeals, and from an adverse decision of the Board of Appeals either to the Court of Custom and Patent Appeals or to a United States District Court in equity.

Rights of Inventors

The sole inventor has the exclusive right to obtain a patent from his invention. However, the question of joint inventorship arises when two or more parties mutually contribute toward the invention.

An inventor who conceives the ultimate invention may employ the mechanical skill of others to work out the practical details of an invention and retain the right to consider himself the sole inventor.

But, where one party conceives the general broad idea in an invention and discloses the same to another, then the other party contributes more than mechanical skill to complete the invention, and either or both work out the practical details, the parties are joint inventors and have a joint right to obtain a patent for their invention.

Rights of Patentees

The sole patentee has the exclusive right to make, use and vend his invention anywhere within the territorial limits of the United States. He may assign his entire patent to others or he may create a joint ownership with others by the assignment of a proportionate interest in his patent to one or more parties. The sole patentee or any assignee under him may grant to others the right to make and/or use and/or vend his invention under whatever terms as may be agreed upon.

Rights of Joint Patentees and Joint Owners

Where there are joint patentees or joint owners of a patent, each party has the right to make, use or vend the invention or grant licenses to others without regard to the interest vested in his co-owners and without liability to share his profits with his co-owners. When it is the intention to share profits it is essential to execute an agreement between joint patentees or joint owners of a patent defining the respective rights of the parties relative to the granting of licenses and accounting for profits.

Rights of Employers

When an employer by express contract engages an employee to invent, all inventions made by the employee during the term of employment become the exclusive property of the employer.

Also, when an employer by express contract engages an employee to make one or more specific improvements, or improvements within the scope of the employer's activity, all inventions made by the employee during the term of employment relating to the said specific improvements, or improvements within the scope of the employer's activity become the exclusive property of the employer.

In either of the above cases the employment contract should show a consideration passing from the employer to the employee to compensate adequately for the special inventive faculties to be used by the employee, the results of which inure to the sole benefit of the employer.

As a matter of protection to the employer and to guard against the possibility of the employee being engaged by a competitor to invent upon the termination of the employment contract, a provision should be made in the employment contract for the assignment to the employer of all future inventions made by the employee within a definite period of time after the termination of the employment contract, or, a provision should be made for the assignment to the employer of all future inventions made by the employee after the termination of the employment contract pertaining to a certain class or classes of invention or improvement within the scope of the employer's activities.

The latter provision should be

coupled with an agreement to pay the employee certain stipulated royalties on all future inventions adopted by the employer with an alternate for releasing said future inventions if not adopted within a certain period of time after affidavits of conception are presented to the employer.

Rights of Employees

In the absence of an express contract vesting the right to the inventions and patents of an employee in the employer, all inventions and patents resulting therefrom made during the term of employment belong exclusively to the employee subject, under certain circumstances, to the shop rights of the employer as follows:

(a) An invention made by an employee within the scope of the employer's business invented along the usual line of activity of the employee belongs exclusively to the employee subject to the shop rights of the employer.

(b) An invention conceived and perfected by an employee within the scope of the employer's business invented outside of the shop and outside of the usual hours of employment belongs exclusively to the employee subject to the shop rights of the employer.

(c) An invention made by an employee not within the scope of the employer's business belongs exclusively to the employee.

(d) An invention made by an employee not within the scope of the employer's business belongs exclusively to the employee unless the employee permits the invention to be constructed and used by the employer prior to obtaining a patent therefor, in which case it is subject to the shop rights of the employer.

(e) An invention conceived by an employee not within the scope of the employer's business and after the usual hours of employment but perfected within the shops of the employer and by the material, equipment and tools of the employer belongs exclusively to the employee subject to the shop rights of the employer.

Shop Rights

A shop right is an implied irrevocable license to make, use and vend an invention of an employee which is vested in his employer by virtue of certain facts and circumstances surrounding the general relationship of employer and employee as defined in the preceding section.

A shop right is non-exclusive, unassignable and is non-transferable except when the business of the employer is merged with that of another, or, when the employer's business is taken over by others in its entirety.

Employment Contracts

The following suggested form of employment contract will usually suffice except in special instances, in which case, patent counsel should be consulted.

In consideration of my being employed by the . . . . . Company and the renumeration to be paid for my services during the term of my employment, I hereby covenant and agree as follows:

(a) To disclose immediately to the Company's patent counsel (or any designated official) each and every improvement or invention which I may conceive solely, or jointly with others, during the term of my employment or within the period of . . . . years thereafter which relates to any product or products made, used, sold, or under development by the Company, or, which relates to any method, process, apparatus or machine now used or which may be used in the manufacture of the product or products made, used, sold, or under development by the Company;

(b) To assign, transfer and otherwise vest in the Company the entire right, title and interest in each and every improvement and invention designated in paragraph (a) hereof;

(c) To execute all instruments necessary for the filing and prosecution of applications for Letters Patent of the United States or any foreign country for each and every improvement and invention as designated in paragraph (a) hereof, and, to assign all right title and interest in said applications to the Company.

Signed this the ..... day of

.....19.....

.....

Witness.....

The ninth and concluding installment of this series on Patents will follow in an early issue. —*Editor.*

DON'T READ THIS

Unless You Are a Progressive Tool Engineer

The *March* 1937 issue of *The Tool Engineer* will be devoted to a series of articles on the *Technical Aspects* of *Machine, Tool and Fixture Design.*

It would be a great help to the Editor if you who are on the job, and feel the need of information on certain subjects, would drop a line to *The Tool Engineer,* 2842 W. Grand Boulevard, outlining your problems by means of a sketch and a written explanation.

We believe we can find someone willing to answer your questions. We have had offers of help from very capable engineering staffs who have heard we are preparing such an issue.

We want to make this issue of *The Tool Engineer* one you will treasure—one you will keep for reference. The more questions we have the better we will like it—and the better *you* will like it. *Please* do it *right away.*

"Try-Outs"

" . . . . Then there is the case of the stenographer who came into the office one morning and her friend said, "My goodness, Betty, you look terrible," and she said, "Listen, June, don't you never go out nowhere with no chiropractor"? . . . . I heard a story about a man from Yale. He was making a speech and he had no idea of the value of time and he took the four letters of the word "Yale" to represent the four divisions of his speech. He dwelt quite a while on Youth, and then on Ambition and he talked for a while on Loyalty and wound up with about

(Continued on page 34.)

A Merry Christmas

To Eclipse Friends Everywhere

R. G. MICHELL

A. C. WARN

J. E. MACARTHUR

U. G. THOMAS

A. SUBIA

F. O. JAPPEL

The Eclipse sales, engineering and manufacturing departments sincerely appreciate your co-operation and interest in our products.

In return we will always exert every possible effort toward meriting your continued good will, confidence and friendship.

Eclipse Counterbore Company

Detroit, Michigan

On Jigs and Fixtures

(Continued from page 18.)

there came trouble with timing gears and we couldn't find out what was wrong. And we analyzed the fixtures and couldn't find anything wrong. We checked the machine tool and it seemed all right. That was at the time, if you remember, when we cast hardened gears in opposition to tempered gears. We started analyzing the heat treatment. The metallurgist was walking down the shop and he met a big son of a gun with a wheelbarrow tossing the gears out in a heap and the corners were all scratching each other and that was the bottom of the whole trouble. So don't forget the human element in your work of handling fixtures.

How do we train Tool Engineers? I am maybe treading on dangerous ground here. I think we should train Tool Engineers the way we train our welding engineers. Mr. Lincoln has a school in Cleveland for the training of welding engineers. In that school he trains them how to weld with the electric arc and nothing else. He turns out splendid men but all they know is electric welding, and of course it is quite sufficient for his purpose. He is doing a good job. But would not those men be better off if they knew something about the competition with welding, about foundry practice, about machine tool practice, about acetylene welding. I think they would be broader men, men with more intelligence and vision. That principle is the principle that we go on and we train our men in economics. We believe they ought to know the why of things. Why is an I beam in I sections? Why isn't it tubular as we used to have it? Why isn't it an oval, why isn't it something else? Why has Mr. Ford an eight cylinder engine, and Chrysler a six? There are economic reasons behind those things and we want our men trained in the economics of the thing and we want them to know why one fixture is made one way and another fixture another way. A thought just occurred to me and that is this, that we should do some standardization work on our fixtures. Nothing worries me more than to see a man pulling and tightening on a fixture. It should be so that every operation is exactly the same on the job. I digress a little bit.

The next thing is that a man should be educated in cost accounting. Very few engineers are educated in cost accounting. We are becoming money conscious. We lessen the cost all the time. And how are we to lessen cost unless we understand cost? We are doing a rather interesting thing, if you don't mind me bringing up my own work for a minute. We are trying to make our students cost conscious. And when they enter our machine shop, for example, we give them a piece of steel out of which they are going to make an armature shaft. To the student that looks like a piece of steel. We try to get them to think of it as a piece of money and we tell them the cost of that piece of steel, so many cents per pound, so many cents per piece. And we tell them, "You are going to add money to it by adding your labor and overhead by the use of the machines and use of power and so forth, and eventually the cost of that piece of steel will be so many cents or perhaps a dollar or so and eventually a motor and other parts will be made out of that steel and the value of that motor is so many dollars. They are beginning to react to it. They are beginning to realize that cost is an important element. I had rather a funny experience in the shop, where the stock losses were very heavy, about 35%. A Scotchman hates scrap losses. I was very much puzzled as to how to get this scrap loss down and one day the foremen were having a bull session and I wandered down past them and pulled a handkerchief out of my pocket, and with the handkerchief I pulled out a dollar bill and dropped it. And they all made a scramble for the dollar and held it out to me and said, "Hey, John, you lost a dollar. And I said, "Yes, darn you, you make a scramble for a dollar bill but would you move a step to save a dollar's worth of material." Well, we had quite a session about material being money.

We are training our students in cost consciousness. We have a foundry forge and welding shop and we train them in those different things. We believe in the future of tool engineering. I can't help but think that for every product designed, if you take a connecting rod for example, for every product designed there are probably you know better than I do, probably some twenty or thirty fixture designs. For every product engineered, and I would like to know the exact number, there must be somewhere around eight or ten tool engineers. The tool engineering profession can't help but follow the lines of the production engineering profession. At one time, many years ago, the production engineer was a big bully, a great big slave driver, and he was a man of very poor intelligence. But you have seen the production engineer advance to where now he ranks with the chief engineer. I think the Tool Engineer is going to do the same thing. He is taking a little slower than I thought, but he certainly will rank with the chief engineer of the company and be one of his colleagues. We are so interested in that that we are forming a section of the American Society of Tool Engineers at Columbus. We will be forming it in a very short time and we are going to go a step further. Next March or April we are going to have a show, exhibit, or conference, and we are going to have exhibits of tools and fixtures there from the University and from our friends of the University in industry in Columbus. We would like to keep those things to ourselves, we are selfish, but we want the men in industry to come and meet us. We are awfully interested that we should meet men in industry so we can keep up-to-date that way in these things. We are going to develop the Tool Engineer. And we are going to try to make a good job of it because we believe it is necessary and we believe it is going to be well worth while. Let me close with a little quotation from Rudyard Kipling. He wrote this approximately forty years ago and at that time there was little thought about the machine. He said—

> We're creepin' on wi' each new rig-less weight an' larger power
> There'll be the loco-boiler next an' thirty knots an hour!
> Thirty and more. What I ha' seen since ocean-steam began
> Leaves me no doot for the machine; but what about the man?

B. L. Diamond with Glenzer Company

A.S.T.E.'er B. L. ("Lee") Diamond is now connected with the J. C. Glenzer Company, Detroit, Michigan, in a sales and engineering capacity.

Way Type Multiple Drillers "HOLEUNIT" Construction

Shown above is a NATCO Way Type machine . . . distinctly a single purpose multiple driller built to drill a total of 57 holes in the bottom and two sides of a large cast iron cylinder block . . . yet the machine is built of standard NATCO HOLEUNITS . . . and may be altered as required with a minimum of expense.

● NATCO HOLEUNITS are completely self-contained and no connections other than electrical are required. They are flexible and interchangeable . . . and they make possible the building of highly specialized drilling and boring machines for high production . . . yet these units are standard in every respect.

● Equipped with a semi-automatic hydraulic feed, NATCO HOLEUNITS will operate at any angle. They may be arranged in groups to perform all the required operations on a casting with a single handling. Should the part for which the units are arranged be altered or discontinued, it is only necessary to rearrange the units, equip them with new spindle boxes and the machine may be used for an entirely different piece of work.

● NATCO HOLEUNITS are built in a variety of sizes and capacities. Call, wire or write for a NATCO representative. Investigate these NATCO HOLEUNITS TODAY.

Here is the NATCO *method*

of Building FLEXIBLE High Production

Drilling, Boring and Tapping Machines

● The installation of modern efficient manufacturing equipment is the first step to lower costs and increased profits. NATCO Engineers will be glad to study your drilling, boring and tapping problems. Without any sort of obligation on your part we will make a careful survey and lay our recommendations before you . . . then you be the judge as to whether they can increase your profits. Send in your prints or call a NATCO representative today.

● Chicago Office, 2009 Engineering Bldg., 205 West Wacker Drive; Detroit Office, 409 New Center Bldg.; Factory and Home Offices, **The National Automatic Tool Co., Richmond, Indiana, U. S. A.**

NATCO

NATCO Drilling, Boring, and Tapping Equipment

A RECORD OF J&L

READ THE PRODUCTION REPORT ON

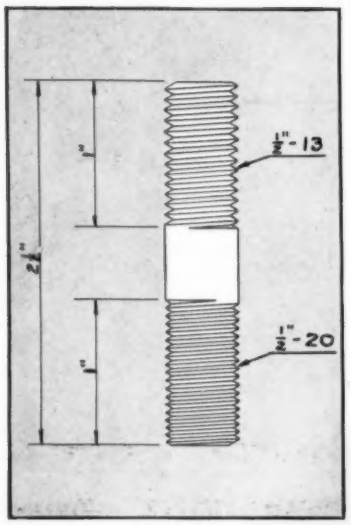


FIG. 1. The ½" stud on which a production of 3200 to 3700 pieces per grind is obtained.

THE MODEL 21 J&L DIE WITH GROUND THREAD CHASERS

(THREAD TOOL DIVISION)

JONES & LAMSON MACHINE

ACHIEVEMENT

THESE TWO STUDS . . .

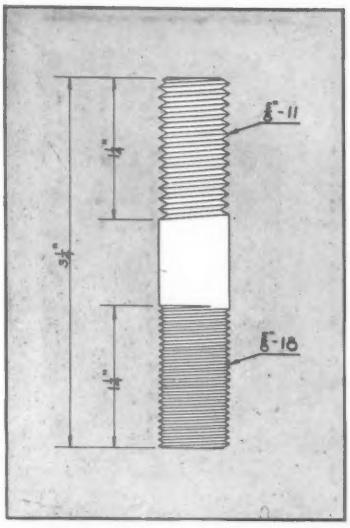


FIG. 2. 2100 to 2530 pieces per grind is obtained in threading this 5/8" stud.

"ANOTHER EXAMPLE OF J&L THREAD TOOL SUPREMACY"

The two studs, illustrated on these pages, have been in continuous production in a well known tractor company for the past six years. The threads are cut with Model 21 J & L Die Heads, which, in spite of their long and continuous use, show no signs of wear.

Figure 1 illustrates a ½" stud made of X-1335 material. The threads on both ends are 1" long. The pitch diameter tolerance is held between .454 and .455. 330 pieces are threaded per hour with an average from 3200 to 3700 pieces per grind.

The stud shown in Figure 2 is also made of X-1335 material. This is a 5/8" stud and is threaded over a length of 1¼ inches. This job runs 240 pieces per hour, holding the pitch diameter tolerance from .570 to .571. The chasers used in threading this stud average 2100 to 2500 pieces per grind.

Thousands of satisfied J & L Die Head users are the best proof of J & L Die Head supremacy.

May we send further information or performance figures on other J & L threading achievements?

COMPANY, Springfield, Vermont, U. S. A.

December Chapter Meetings

Chapter Meeting Announcements must be received on or before the 20th of preceding month. Omissions are the result of not receiving this information by this date—in time for publication.

CLEVELAND

December 15th, 1936

Dinner: 6:30 P. M.

$1.00 per plate

Technical Session at 8:00 P. M.

Nela Park, General Electric Company, Noble Road Entrance

Dinner and Technical Session will be held in the Dining Room in the Sales Promotion Bldg.

Speaker: Mr. J. W. LOVE, The Cleveland Press, Cleveland, Ohio.

Subject: "Second Thoughts on Russian Industry."

We are fortunate in securing Mr. Love to speak on this topic as he was in the Soviet Union this summer studying industrial and other economic conditions.

Mr. Love is a graduate of Oberlin College and has been in the newspaper work in Cleveland 21 years beginning with the Plain Dealer as a reporter. He spent a year with the Cleveland Foundation doing the editorial work of the Foundation's survey of criminal justice and has been with The Press for the last six years editing his column "Today's Business."

This being a Christmas Party the ladies are invited and there will be prizes for everybody and attractive door prizes for lucky ladies.

Kindly make reservations with Mr. G. J. Hawkey, Penton Building, Telephone Main 0112.

FREE PARKING

DETROIT

December 10th, 1936

"Chrysler Night"

Dinner: 6:30 P. M.

Technical Session: 8:00 P. M.

Hotel Fort Shelby

Speaker: Prof. JOHN J. CATON, Educational Director of the Chrysler Institute of Engineering.

Subject: "Behind the Scenes of Engineering"

with an introduction by

K. T. KELLER, Pres. Dodge Brothers

An unusually large attendance is anticipated for this meeting—make your reservation immediately to insure a dinner place.

MILWAUKEE

December 10, 1936

Republican House — Colonial Room

"Around the Blackboard Discussion" — 8:15 P. M.

R. E. Rutzin of Cutler-Hammer Corp. will give a short talk on

"Coordination of Tool Procedures"

Technical Session — 8:40 P. M.

Speaker: Mr. A. ALTENHOEFER, Carnegie-Illinois Steel Corp.

Subject: "Story of Steel"—illustrated with motion pictures.

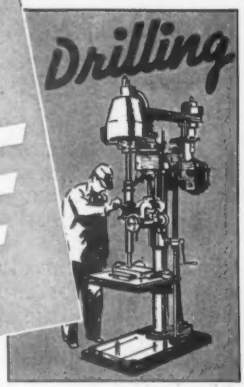
Following the technical session a short entertainment program will be given and a buffet luncheon served.

Tickets—75¢ upon admission to the meeting.

Readers of *The Tool Engineer* and friends of the American Society of Tool Engineers, whether members or not, are cordially invited to any of the above meetings.

EVERY METAL-REMOVING JOB *Will Show*

THERE IS A DIFFERENCE



What is your toughest production job? Milling stainless steel? Reaming rough castings? Thread-cutting aluminum alloys? Drilling manganese steel? There's a Morse Tool made for each job — made so it will do that job in a way that will prove to you "There is a difference."

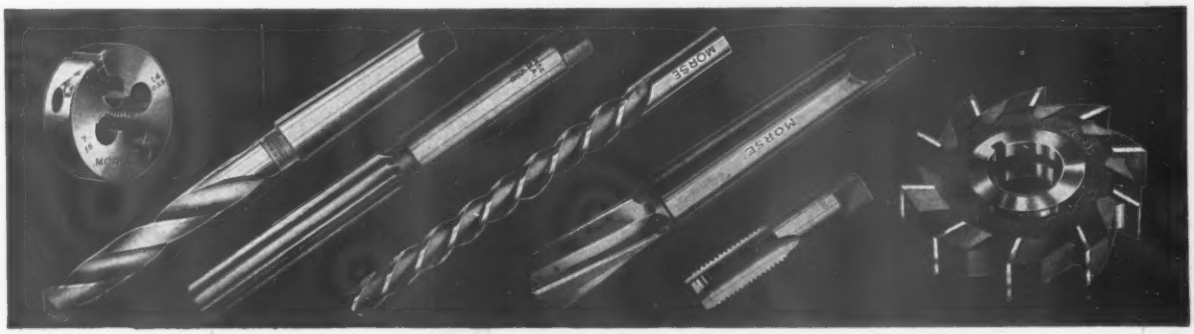
If you have special requirements which the Morse distributor cannot meet from the wide Morse line, our engineers will be glad to work with you. No matter what the job, a side-by-side trial of Morse Tools with other leading makes will demonstrate, "There is a difference."

THE MORSE LINE INCLUDES
HIGH SPEED and CARBON

DRILLS	CHUCKS
REAMERS	COUNTERBORES
CUTTERS	MANDRELS
TAPS AND DIES	TAPER PINS
SCREW PLATES	SOCKETS
ARBORS	SLEEVES

A Conveniently Located Morse Distributor Will Give You Prompt Service.

MORSE TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASSACHUSETTS, U. S. A.



REMINISCENCES

THE OLD DAYS—AND THE NEW

By

Anders Janson

"They don't train men any more," the old timer grumbles. "Why, in the old days . . . ." Oh yes, the good old days! But then, that is what the youngsters of today will be saying when we are straining soup through our chin whiskers, even as our granddaddies said it before us. Now, my own personal recollections of the good old days start with the turn of the century, as far as the shop is concerned, and, being in a reminiscent mood, I will hit the high spots from then on up to the present.

I was initiated into Industry via the cotton mill, i.e., I ran a braider in a shoestring factory during a vacation from school. The less said about the mill the better; it was rank, mechanically, sanitarily and morally. The cotton storage room invited the amourous and the latrines repelled the fastidious; the air was filled with fine lint that made even the kids (some of us hadn't turned ten) look like Santa Claus gone through a blizzard, before the quitting whistle blew. There were a lot of fingers missing, owing to a trick some of the initiates had of poking their index fingers into a train of gears and neglecting to tell the novices that only gears running *outward* were safe to play with that way. We had no running water, instead, a boy went to the pump every so often, when everybody lined up around the pail for a drink. I made the mistake of rinsing the lint from my mouth one day, and the foreman, to teach me a lesson, spat in the dipper and tried to make me drink the concoction. I was fired because the foreman lost a few front teeth. The dipper was of tinned cast iron. However, the brief sojourn in the mill has proven valuable many a time since then; at least, it inspired an interest in mechanics.

Next, I was carrying dinners to the senior male of the family, at the old Granger Foundry and Machine Co., in Providence. It was quite a modern plant, comparable to many considered up-to-date today. The main building was two story, with mezzanines flanking a central craneway. They built textile machinery—callender rolls, tenters, etc. Too often (so the truant officer said) I got so interested watching the machinery that I forgot to go to school; at any rate, I learned what made the wheels go 'round—and why.

Done with grade school, I entered as apprentice with the Goodson Electric Ignition Co., makers of the first honest-to-gosh magneto for the new fangled automobiles. Only, we installed them on every type of gas engine, from the hot tube to the modern (then) make and break spark plug fired. It took some husky work with a tap wrench to adapt the former into the latter. Once I was sent to install a mag in an auxilliary fishing sloop, and deciding to try it out, was well on toward the Atlantic when she ran out of gas. Luckily I had learned to handle sails, so got back in time to go to work next morning. Oh yeh, them were the days.

About that time the side-winder Oldsmobile was the popular car—at least in that section—with the Winton, the Cadillac, the White steamer and a few others chugging along. I remember seeing a Knox (it had studs screwed into the cylinder for air cooling) puffing up a hill with the engine so hot it just glowed red. I got the bug too, and built me a single cylinder engine that I mounted on an abandoned buggy, but by the time it was finished (it took two years) they were putting the engines under the hood. Improvements came fast, after that.

Several years before that, I had spent a few months in a hospital, and had the good luck of being placed between an architect and an artist, both with broken legs. Between them (literally) I learned the rudiments of mechanical drawing and developed a fair aptitude for sketching. During my apprenticeship, this helped get me on the board, sometimes detailing, sometimes designing the simpler jigs, fixtures and cutters then in vogue. We made form cutters, counterbores with interchangeable pilots, and often, in lieu of fixtures, used vise jaws which served admirably. We also designed and made numerous gauges, since the magnetos were manufactured on an interchangeable basis. In fact, we were quite modern; so modern that I am often suspicious of speakers who prate of the crudities of tooling during the early days of the auto industry.

During apprenticeship, I went to evening high school, then, my time up, went to Brown & Sharpes, in the gear division. In addition to the usual run of general purpose gears, we made transmission and differential gears, all to high standards of accuracy. Ben Waterman was foreman, and now a prominent Detroit tool manufacturer was in the department, improving production methods. From Brown & Sharpe's I went to college; between semesters worked in various eastern plants, among them the Alco—The American Berliet. There, tooling methods were on a high order, and production was on piecework basis. Multiple spindle drills, automatic turret lathes and screw machines vied with the latest in milling machines and boring mills; the assembly line was for precision as befitted a high grade car, rather than mass production. It was a grand old boat, at that.

Reminiscing, I get away from the main factor—*men*. Yes, they trained them, back there and in those days. Personally, I trained under a martinet, but a *gentleman*—a fine engineer and an incomparable mechanic. We were encouraged to do government work, i.e., make tools and models for ourselves. I had a creditable kit when my time was out, including a set of gauge blocks (hardly comparable to Jo blocks) that were quite accurate. They seasoned a year, then took another year or so for the final lapping. Also, I had several model engines and electric motors, besides the horseless (not always) buggy previously mentioned.

Brown & Sharpe's had a fine apprenticeship course, taking four years. Many of their present ranking executives graduated from that course, which was *very* complete. Those apprenticeship courses were taken very seriously by the boys, and machinists had

(Continued on page 36.)

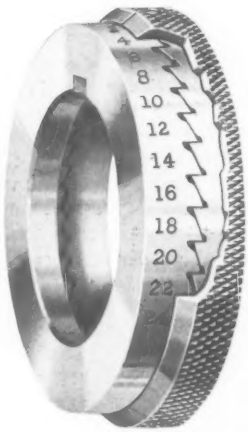
SCULLY-JONES & CO.

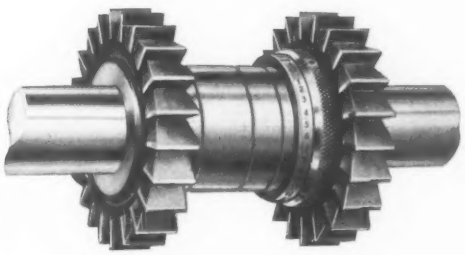
Milling Machine Arbors

QUALITY ARBORS

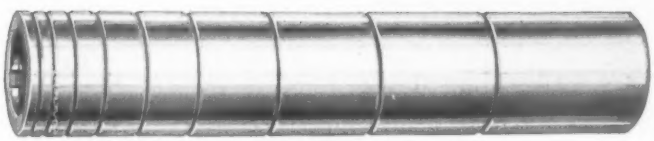
for All Makes of Machines

Adjustable Spacing Collars





Solid Spacing Collars



STANDARD TOOL CATALOG 105

SCULLY-JONES & CO. — 1901 South Rockwell Street — CHICAGO, ILLINOIS

Handy Andy's . . Workshop . .

One of the boys complained that his letter of announcement for the November meeting was full of cigarette ashes. (Or was it butts?) Well, it happened like this: About 1 A.M., when my fingers were all thumbs and my head dizzy from mimeographing, folding, enclosing, sealing and stamping some oodles of the letters I inadvertently stuck the rubber sponge into the ash tray instead of the water bowl. Excuse it, please.

* * *

The crowd was rather slim at the November meeting, Detroit, yet, was one of the most interesting meetings we have had for some time. It just happened that Prexy Lamb and Secy. Brunner, of the National Society, were 'Way Down East' selling the idea of the A.S.T.E. to the boys in the Nutmeg state, and plenty of our own members were absent due to business for their respective companies. At that, I am informed that Slim McClellan flew in from Chi and have it on good authority that Dan Karpinski was speeded on his way Detroitward by the police forces of three cities. It seems that the first speed cop couldn't catch him and the rest hadn't changed to winter grease. Anyway, Dan won.

* * *

Prof — er, excuse me! *John* Younger stirred up a lot of interest while rambling around among jigs and fixtures at the Detroit meeting. His talk evoked a lot of comment from the floor, and that is what we want, exchange of ideas pro and con. A real guy, though, the Pro—uh, *John*—whom we gladly recommend to our brothers. For reasons which I won't mention here I think he has a streak of Swede in him, although I won't insist on that point. But that's Okay—I own up to having a bit o'Scotch in me.

* * *

One of the boys—Mr. Oliver—suggested that a broad vocabulary is indicative of high executive ability. I'm really glad he brought that up, because, in the first place, it will stimulate the sale of dictionaries, which means more business, and in the second place because I have been looking for a good comeback to one of the boys who accused me of using too much flowery language in my writing. What I can't say to him now! * * *

But seriously, a broad vocabulary is at least indicative of intelligence, and the fact is that our Tool Engineers need feel no inferiority complex when it comes to the use of English. It just takes practice to use words, and our informal after dinner discussions give our members opportunity for expression. But, however the comments are couched, there is thought and intelligence behind the expressions. We have a great gang.

* * *

You know, of course, that engineers rank about the highest in intelligence tests. Anyway, you know it now.

* * *

We have been broached to permit translation of some of the articles in *The Tool Engineer* into foreign languages. I tell you this so that you may know that our publication has real standing in the engineering world. *It is being read.*

* * *

Some of the boys have been up on the Dionne Farm gathering stones—and they're not meant to be thrown at the alley cat. However, I have heard that mothers of quads, quints and sexts are apt to be rather overbearing women. Not that I'm throwing any stones, y'understand.

* * *

You know, this being Chapter Secy., Editorial Ch'man, (and a few other things) entails a lot of work and grief. I get panned plenty, the wife threatens to swap the parlor furniture for office equipment (and that ain't all) and they've shod the housecat with sponge rubber so he won't make so much noise stomping around. Oh well, a fella can't catch hell if he doesn't do anything.

* * *

But then, there are compensations, as "auld acquaintance" come mind. Heard from Norman Brownsword — he's back where they make wooden nutmegs and by now a member of the Bridgeport (or is it Hartford?) Chapter. A swell chap, that boy—a scholar and a gentleman.

* * *

The way the months roll along next April will soon be here, so, I'll have to hustle If I am going to fill the empty niches in my personal Hall of A.S.T.E. Fame. For now, I nominate O. B. Jones, because he is a good starter and a better finisher. Not much noise but plenty of accomplishment. I also include Al. Sargent, because he gets things done, and Bill Smila because of his meritorious work on the Standards Committee. (Among other things.) And R. M. Lippard—that chap should have been a lawyer. (Perhaps that's why he's on the Const'n & By-Laws Com'tee.

* * *

Bill Smila put me on the pan for not double checking *The Tool Engineer.* (Page 28, 2nd. col.) "We launched our first Standard Sheets at the Machine Tool Show last fall . . . . since that time we have made two millions sheets. . . . I think we have made fairly good progress . . . ." I'll say! What he said was: "Since then we have made two *mailings* . . . . " Oh well' what's a million more or less? Anyway, they look like two million when you start sorting 'em out for mailing—and there have been *plenty* sent out. They're going over BIG.

* * *

C. A. Dundare, Secy. of the new Bridgeport Chapter, goes at things as if he meant business. We'll be hearing from these nutmeg graters, mark my words.

One of our boys, an ardent Republican, was seen wearing his Landon button upside down the day after election. "The elephant had an upset" he explained.

* * *

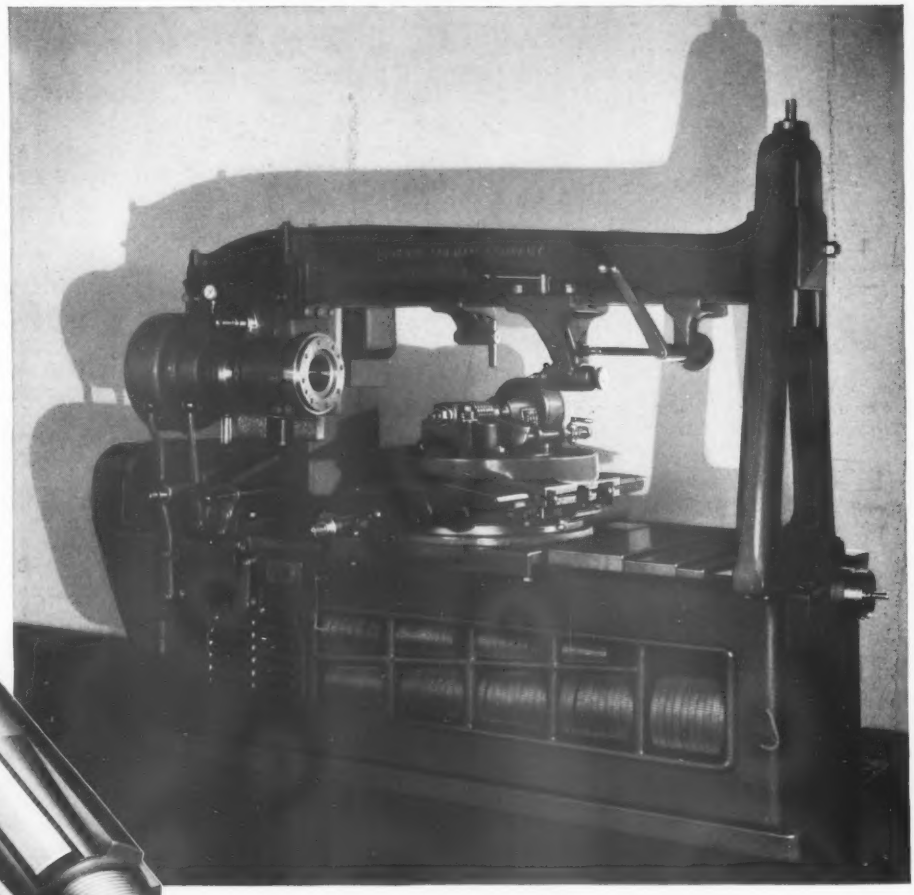
The general prediction is that '37 will be one of the greatest years in industrial history. *I* say, it will be but a prelude to the greatest economic era in *all* history. Now is the day of the *trained* man, and the gods help the short sighted employer who surrenders his key men to a rival. Better hang on to your trained men, Mr. Boss.

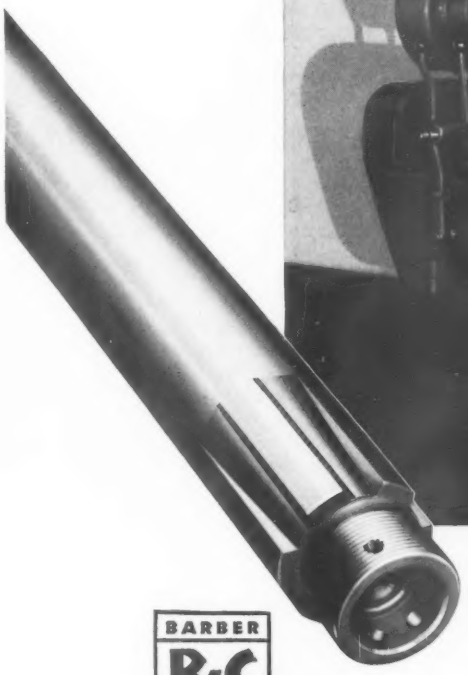
With Keller of Chrysler's and Cameron of Ford's slated to speak at the next two Detroit meetings, it looks as if the S.R.O. signs will have to be dusted off. Naturally, we will extend all the courtesies of the occasion to our many guests of those evenings, but suggest our members anticipate their reservations.

Well, that's all for now; I've got to get some rest before going to the A.S.T.E. Fall Festival. I'll tell you about it later. H. A.

Type T Hobbing Machine

BARBER B-C COLMAN





And Taper Splines...

The Barber-Colman Type T Hobbing Machine is used for all kinds of hobbing in general and for taper splines in particular. Compared to other means of mounting machine members or parts on shaft ends the taper spline is stronger, more accurate, more durable, and relatively inexpensive. It provides solid metal-to-metal seating between shaft and mating part but the two can be separated easily if desired. The advantages of the taper spline are a plus value acquired with the purchase of a Barber-Colman Type T Hobbing Machine. Investigate! Write today for complete information.

BARBER B-C COLMAN

PRODUCTS

MILLING CUTTERS, HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, SPECIAL TOOLS

BARBER-COLMAN COMPANY

General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.

Represented in the Detroit Territory by HODGES MACHINERY CO., 544 New Center Building

Letters

Davenport, Iowa,
316 East 29th St.,
Oct. 21, 1936.

The Tool Engineer,
2842 W. Grand Boul.,
Detroit, Mich.

Dear Sirs:

Out in this neck of the woods we are only beginning to learn that such an organization as the A.S.T.E. exists. I have, I believe, seen at least four copies of your magazine The Tool Engineer.

I will be compelled to differ with the writer of "What is Wrong With Tool Design," Mr. Andrew E. Rylander, when he states that United Shoe Co. is credited with being the pioneer in Interchangeability."

The true Father of Interchangeability was Simeon North and it was in the manufacture of guns, commonly called firearms that this was brought about. It is stated as a part of the history of Mechanics that long before the Civil War (1820) "parts of guns were strewn on the floor and a gun assembled from parts picked by random from the piles on the floor and that the gun functioned fully as well as one that had been hand fitted." That was a part of the work of Simeon North That was before the days of "The Mike."

Back in 1900, the original plant of the United Shoe Co., in Boston, I believe Brighton, laid out all parts and babbited all bearings in place. That was not interchangeability as we of the gun plants of that day knew it.

Mr. Rylander is right when he states that Tool Design in so far as it refers to jigs and fixtures has stagnated or retrogressed for it really has. Most designers are copying the things that I put out in 1900 in a gun plant, as modern tool design. One of the things that has held tool design back has been and is the custom of the Chief Engineer and his assistants saying "We don't do it that way here."

Mr. Rylander again makes a pertinent statement in his statement that is but the words of Joe Manton about 1800 "Don't invent anything, do it the way they did it last year or a century ago."

In the October issue of The Tool Engineer Mr. Charles J. Martin makes a statement that I cannot agree with. He states: "In at least 75 per cent of cases *the fixture is the most important part because the part that is to be manufactured can be machined just as accurately as the fixture is built." My contention would be that the accuracy of the fixture must be twice the accuracy of the part when machined or that any inaccuracy in the fixture is doubled in the part. An inaccuracy of .003 in the fixture means a tolerance of .006 in the part or just double the accuracy of the fixture.*

That article of Mr. Rylander's is worthy of copying in our national magazines.

Very truly yours,

C. G. Williams, M.E.

We put Mr. Rylander "on the carpet" about interchangeability in firearms manufacture. "Yeh, I slipped up on that," he said. "And me a gun lover, too. Anyway, I can't remember back to 1820. However, United Shoe was actually manufacturing on interchangeable basis by 1910, with very rigid inspection standards. Mass production, as we know it, saw its birth shortly after the turn of the century."

Of one thing we are certain, however; *The Tool Engineer* is being *read* in many a "neck of the woods," both here and abroad, and it is becoming a moot question which is the more interesting to our readers—the articles we publish or the comments they evoke. We thank Mr. Williams for his interesting letter, with its reminiscences and friendly challenge. —*Editor.*

New Literature

A **New Handbook,** now in fourth edition, contains 223 added pages of new **arc welding data** and 289 new illustrations, including photos and drawings. The volume now contains 819 pages and 990 numbered text illustrations. The Procedure Handbook is 5¾ x 9 inches, an ideal size for desk or shop use. Copies will be mailed, post paid, to any address in the United States for $1.50 per copy. Outside United States, $2.00. Address Lincoln Electric Company, Cleveland, Ohio.

According to latest estimates, the total number of nickel alloys developed up to the present time is somewhere between 4,000 and 6,000, most of them special alloys for special purposes. For all practical purposes it is usually enough to know which metals and alloys are most generally useful—alloys like Monel for instance—what their properties are, and how well they have performed under actual service. That is the sort of information and data you will find in the publications offered in List "B" **of The International Nickel Company, Inc.,** 67 Wall Street, New York, N. Y. Write for free copy—or address *The Tool Engineer.*

Hannifin Manufacturing Company, Chicago, Illinois, **Bulletin 39** describes "Hy-Power" Hydraulic Riveters, giving specifications, unusual applications, methods of installation, operating instructions, etc. Profusely illustrated.

Feedex Corporation, 4016 Dewey Street, **Toledo, Ohio**—Bulletin on the new Feedex—**"Feed-Index Table Unit,"**—for "Simplest conversion of obsoleted machine tools, or to guarantee production efficiency with maximum flexibility in new machines." Address Feedex Company direct, or *The Tool Engineer.*

Landis Tool Company, Waynesboro, Penna., has issued new literature on the **Landis 5" Type C Hydraulic Piston Grinder.** May be had for the asking—designated as bulletin No. D-36. Landis also announces a new piece of literature on the new **Landis 5" Type D Hydraulic Cam Grinders.** Designated as bulletin No. C-136.

Hanna Engineering Works, 1765 Elston Avenue, Chicago, Illinois has just completed a comprehensive catalog describing **Hanna cylinders.** It has been compiled to enable those wishing to consider applying an air cylinder to easily determine if a cylinder of a given diameter and length of stroke can be incorporated in their plans. The **new catalog contains dimensions, capacities and illustrations** of just about **every type of cylinder to meet installation** — particularly mounting requirements.

National Twist Drill and Tool Company of Detroit, Michigan have recently released their Engineering Bulletins Nos. 131 and 123 on **"Feeds and Speeds for Milling."** Bulletin 131 **gives figures in table form for "average conditions" with correction factors for various materials** such as S.A.E. steels, cast steel, cast iron, monel metal, etc. Bulletin 132 gives a complete explanation of how to use the data in Bulletin 131 and works out typical examples for easy reference. The sheets are punched for three ring binder and are of standard size for easy filing or binding. Mention *The Tool Engineer* when writing for your copy.

Much information of practical value to Tool Engineers and production men concerned with the accuracy and finish of rolls is contained in the new bulletin No. 111, just issued by the **Farrel-Birmingham Company, Inc., Ansonia, Connecticut.** The new bulletin explains the necessity of the modern roll grinder in the metal rolling industry. It describes the design and construction of the Farrel Heavy Duty Roll Grinder and the "Five-Point Performance" claimed as an advantage of this machine.

In considering problems arising in connection with roll grinding, the data in this bulletin should prove helpful. Address *The Tool Engineer* for complimentary copies on your firm's letterhead.

SUNDSTRAND MACHINE TOOL CO. ROCKFORD ILLINOIS U.S.A.

ENGINEERED PRODUCTION

EXAMPLES FROM THE SUNDSTRAND FILES

No. 3629

Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Hydraulic Loading And Clamping New Features In This Rigidmil

The Sundstrand Hydraulic Rise-and-Fall Rigidmil shown in Fig. 1 mills crankshaft bearings to length, and form-mills an oil throw to size, in the motor blocks shown in Fig. 2. Efficient operation of similar Sundstrand machines brought us an inquiry about the possibility of adding loading, clamping and unloading to the automatic hydraulic operating cycle of rapid approach, feed, and quick return. Sundstrand Engineered Production made these new features a reality in the Hydraulic Rigidmil illustrated. The machine automatically transfers a cylinder block to the fixture from the hardened conveyor-height loading rails on the left, lowers it onto accurate locating pins, clamps, mills, returns, lifts and delivers the block to hardened rails on the right. One Hydraulic Unit—Sundstrand designed and built—supplies pressure for operating the five work-handling, feed and rapid traverse cylinders. Highest possible production is secured, machine operation is smooth, reliable, entirely satisfactory. Investigate the opportunities for turning possibilities into realities on your work—and saving cash. Let Sundstrand Production Engineers quote on standard or special machines for your milling and turning. Ask, with suitable data, and you will receive a reliable answer promptly.

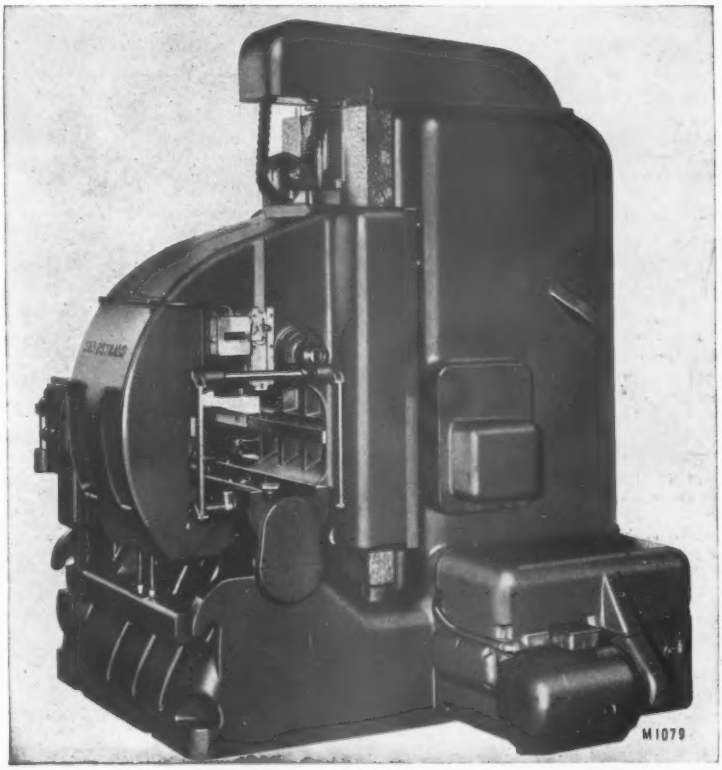


Fig. 1 — Rigidmil with automatic hydraulic loading, clamping, machining cycle, and unloading.

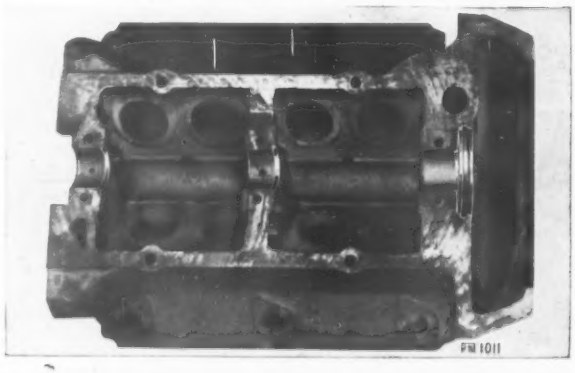


Fig 2 — Cylinder blocks on which crankshaft bearings are milled to length, and oil throw to size, by the Rigidmil shown at right.

SUNDSTRAND MACHINE TOOL CO.

2532 Eleventh Street, ROCKFORD, ILLINOIS, U. S. A.

RIGIDMILS - STUB LATHES

3-Wheel Tool Grinders - Centering Machines

Hydraulic Operating Equipment - Special Machinery

"Try-Outs"

(Continued from page 20.)

forty-five minutes on Enthusiasm. When he sat down a man got up and started to leave the hall and his friend asked him where he was going and he said, "I'm going home. This next speaker is from the *Massachusetts Institute of Technology.*" . . . . A banker was making a speech and he said that banking was a very ancient business. It was mentioned in the Bible —the first clearing house transaction on record was when Pharoah got a *check* on the bank of the Red Sea. He shouldn't forget it was Pharoah's daughter who first made money in the stock market. She took a little *prophet* from the water . . . . Going clear back to the beginning of things. Eve was a great business woman. She invented the loose-leaf system. It was the beginning of bookkeeping. And of course, there was Samson, a great advertising man —took a couple of columns and brought the house down with his act . . . . And then there was Hiram, King of Tyre. You mustn't confuse Tyre with Akron. But Hiram was a very accomplished gentleman. I think he might like *Tool* Engineering. He got a big order from Solomon. He had the time so he went down to see him. Golf hadn't been invented yet. He parked his camel outside the gate, close up. They wouldn't "walk a mile for a camel" in those days. Solomon was busy, he was in conference. You know, when the Queen of Sheba came to see Solomon he entertained her splendidly and gave her wine and *necked her.* He might have been a Tool Engineer, I don't know. Well, I am posing as an authority on the Bible, which I am not. I am like the man who said, "When I was a boy I used to think that Sodom and Gomorrah were man and wife." Up until recently I always thought the Epistles were the wives of the Apostles . . . There was the darky on the rifle range and all his shots were going wild. And the Sergeant said to him, 'John, where are all your shots going?" And the darky said, "I don't know where they goes, but they sure leaves here with a hell of a bang."

Editor's Note.—The above, we hasten to inform our readers, is quoted from a most excellent address by Charles M. Newcomb delivered before a Detroit A.S.T.E. meeting through the courtesy of Motch & Merryweather last April. It inaugurates, most appropriately, this little column wherein we hope—in succeeding issues—to present "the lighter vein" of Tool Engineering. If you have a "good one" for us—we'll appreciate your sending it in for publication.

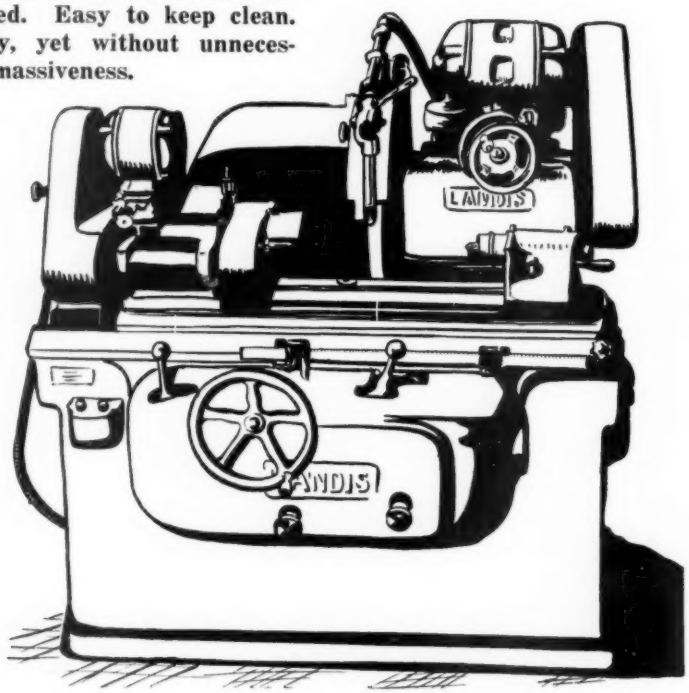
CLEAN-CUT SIMPLICITY

Doesn't clean-cut simplicity in a machine tool impress you?

Look at the Landis 6″ Type C Plain Hydraulic Grinder. Pleasing lines. No complicated mechanisms scattered all over the bed. Easy to keep clean. Sturdy, yet without unnecessary massiveness.

There is a machine with decks cleared for action. Your plant should be the scene of that action.

227



LANDIS TOOL COMPANY
WAYNESBORO, PENNSYLVANIA.

Ex-Cell-O Appoint New Sales Manager

"Thor M. Olson has been appointed Sales Manager of the Ex-Cell-O Aircraft & Tool Corporation, Detroit, Michigan, succeeding Mr. Wm. F. Wise. Mr. Olson held the position as General Manager of the Continental Tool Works from the time it was founded until shortly before it was acquired by Ex-Cell-O in 1930. During the latter part of this period he held the position as President.

After becoming associated with Ex-Cell-O, Mr. Olson became Vice President and a Director on the Board, in which capacity he took an active part in sales work. He has an excellent mechanical background gained through his many manufacturing activities."

A wise man sees as much as he ought, not as much as he can.
—*Montaigne.*

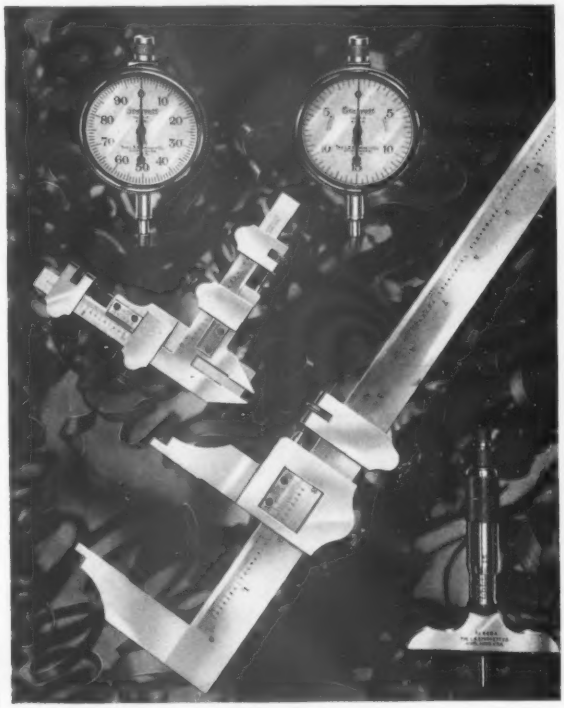
STARRETT
SHOP EQUIPMENT
TOOLS

Starrett Tools and Dial Indicators have always been standard equipment in toolrooms and shops throughout the metal working industries. There is no substitute for Starrett accuracy on important work like laying out and inspecting jigs, fixures, dies and special gages. The new revised edition of Starrett Catalog No. 25T describes and illustrates more than 3,000 fine Starrett Tools. Write for it and the special Starrett Dial Indicator Catalog.

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
Athol, Mass., U. S. A.

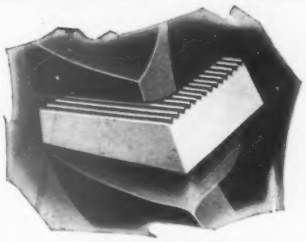
Use Starrett Tools

In the photograph: Starrett Dial Indicators No. 25-F and No. 25-A, Starrett Gear Tooth Vernier Caliper No. 456, Starrett Vernier Caliper No. 122, Starrett Micrometer Depth Gage No. 440-A.



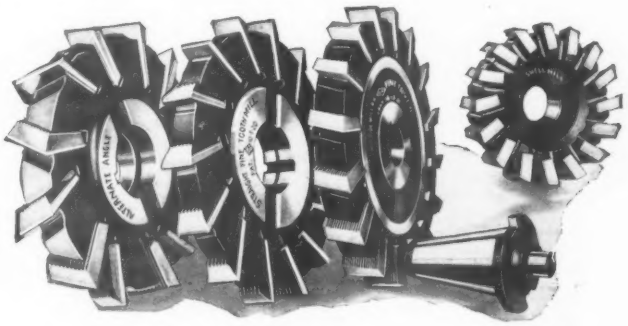
MILLING CUTTERS *that are* COST CUTTERS!

HEREIN LIES THE SECRET!



"CLOSE UP" SHOWING DETAIL OF THE O. K. INSERTED BLADE

It is poor economy to make a cutter entirely of expensive high speed steel when only the outer edge does the cutting. And in the solid, unadjustable cutter, the original size is soon ground away! The edges of the O. K. Milling Cutter are, therefore, separate and adjustable. As will be seen from the illustration, they are locked firmly in place by mating serrations. These serrations permit any necessary degree of adjustment in line of wear.



The blades of O. K. Milling Cutters are made of drop-forged, high speed steel, specially heat treated for long-service cutting edges; the bodies are of tough, chrome-nickel steel, heat treated for maximum strength. This saving in metal, together with the increased flexibility of use of this type of tool, invariably results in faster production and lower costs.

O. K. SAVINGS CAN BE PROVED!

Because O. K. savings can be proved, we would welcome the chance to send a representative to confer with you about a make-good demonstration in your plant. Write us if you are interested.

Manufactured Exclusively By
THE O. K. TOOL COMPANY
Shelton, Connecticut

THE TRADE OK MARK

SYSTEM
OF INSERTED-BLADE METAL CUTTING TOOLS

Reminiscences

(Continued from page 28.)

standing in the community exceeded only by toolmakers, draftsmen and professional men. The pay was small (I had 6, 8 and 10¢ per hour for the three years) and the hours long, but we seemed to find time for recreation along with evening school. Life wasn't so fast, we lived simply but on the whole quite fully. In one shop, a group of us pooled on a correspondence course in engineering; we hired a cottage, a matronly cook and lived the life of O'Riley, using the parlor for a study. We even took patents on automobile gadgets, and sold them.

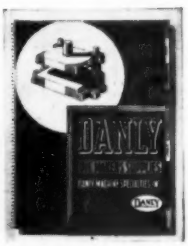
Of course, not all of the boys had Horatio Alger complexes; there were plenty who idled their evenings in pool rooms—and worse. Some of them, to tell the truth, became successful in spite of hell, so I point no moral. Neither do I compare the modern youngsters unfavorably with their fathers; they simply started in different ages—yes, *ages*, even though but a generation separates them. I—and my contemporaries—created this Age of Speed; why complain if our youngsters like it? Yet, I sometimes wonder if, in striving to better their condition, we haven't taken something from them. From childhood, I had to build my toys; (well, by preference) I designed and built models and appliances that were a prelude to industrial equipment; I worked during adolescence and entered college only when I had a trade behind me. By then, education *meant* something, it was a definite means to an end. Because of training, arduously acquired, we helped create an Age of Miracles; keeping mentally young and abreast of the times, we enjoy it and speed it on to greater things.

After all, that is the bright side of this modern picture, that this modern generation carries on. Sometimes we rail at it in exasperation, but go to our evening schools—and they are infinitely superior to what we knew—and see the hordes streaming through their doors, young men and women eager to improve themselves, matured men with young minds keen for the adventure of progress, and we come to realize that the Age of Miracles is barely at its false dawn. The old days were fine—they were fine in Caesar's day—but after all they are only mellowed by time. We can draw on the experience of the past, as one would draw from a vast storehouse if diversely stocked, and there find many things that are new and applicable even today, even as Shakespeare outmoderns the modern.

Anyway, there is no use indulging in maudlin sentimentality about the old days: we are building better automobiles, better tools and machinery than ever before. At least, they stand the gaff better, last longer and are at the disposal of the masses instead of the favored few. For that, we can thank the men who had the "guts" to train themselves: our metallurgists, our engineers—mechanical, research, production and Tool Engineers—the latter last in emerging to prominence but not least in accomplishment. These men are the standard bearers of Industrial Progress; men who, fondly remembering yesterday, nevertheless combine to create a greater Tomorrow.

DANLY PRECISION DIE SETS

SAVE YOU MONEY—HERE'S WHY:



The Danly Catalog makes it easy to select the proper die set for the job at hand. Ask for your copy.

● True, you pay a little more for a Danly Precision Die Set because the guide posts and bushings are perfectly fitted to within ± 1/10,000". That's what gives you the absolute accuracy of die movement that means perfectly made parts. It's one of the reasons why Danly Precision Die Sets can operate at a higher rate of speed—produce more parts before regrinding—protect the dies, as ordinary sets can't. Try a Danly Precision Die Set next time and prove to yourself the difference in long-time economy.

DANLY MACHINE SPECIALTIES, Inc. 2114 S. 52nd Ave., Chicago, Ill.

BRANCHES:

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Rochester, N. Y., 16 Commercial Street
Cleveland, Ohio, 1444 E. 49th Street
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DANLY PRECISION DIE SETS

RIVETT PRECISION SCREW CUTTING LATHE

No. 608

Known throughout the world as "The Master Workman's Master Tool" in laboratories and development departments where highest possible precision standards are required. Its finely made attachments enable a skillful user to finish practically any operation without recourse to other machines. Offered with quick change gear box or change gears; oil pan, bench or cabinet mounting; speed box, horizontal safety drive or countershaft driving equipment. See Bulletin 608-B.

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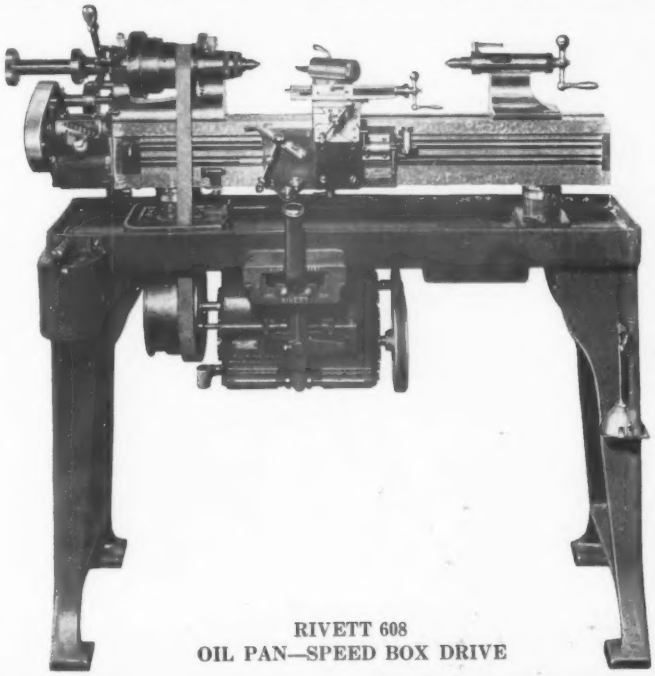

RIVETT 608
OIL PAN—SPEED BOX DRIVE

LIFE INSURANCE is fundamentally protection against the unknown future.
Grinding life in any tool is your protection against high tool costs.
Do your reamers offer maximum protection?

G & G

CAM LOCK REAMERS

offer the maximum life obtainable, from 3/16″ on the smaller sizes to 5/8″ on the larger and this on the diameter where you want it.

THINK IT OVER

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Grinding Specialists

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YOUR OLD WORN OUT MILLING CUTTERS, SAWS, ENDMILLS, DRILLS AND REAMERS

RENU TOOL CO.

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Phone MAdison 0560

TOOLS RENEWED BY RENU CUT FASTER

Production Perspectives

(Continued from page 11.)

used at the **Bethlehem Steel Corporation's plant at Sparrows Point, Maryland. Westinghouse Electric and Manufacturing Company** and **General Electric Company** who will supply electrical equipment, **are to receive orders totalling several million dollars. An order for 16,697 electric refrigerators,** the largest single order of its kind ever placed, and valued at well over one million dollars was **awarded to the Westinghouse** Electric and Manufacturing Company of Pittsburgh, **by** Public Works Administrator, **Harold L. Ickes, according** to an announcement made by an official of the company. These refrigerators are to be used in thirty-four of the P.W.A. Slum Clearance and Low Rent Housing projects, located in twenty-six cities throughout the country where electric rates make this type of refrigeration more economical. Closed since 1932, **the Ford Motor Company assembly plant in Pittsburgh is being reopened, providing employment for one thousand men.** The plant will be ready for work as soon as new equipment and machinery, necessary for operation arrives. The plant is used to assemble parts, delivering the finished automobile to dealers throughout the Tri-State area.

* * *

From **Charlotte, N. C.**, we hear the Elizabeth Mill property on the Dowd Road, **recently purchased** by I. D. Blumenthal, will be **reconditioned** to house the **Radiator Specialty Company.** Textile machinery in the mill will be immediately disposed of. Present plans call for the concern to be housed in its new home by spring.

Another industrial plant for Charlotte, N. C., was assured when a permit was issued to the Moore Brass Works for construction of a smelter plant and office. The plant will be operated by the Moore Metal Processing Company which now has a plant in operation at Winston-Salem. **A. B. Moore** heads the company.

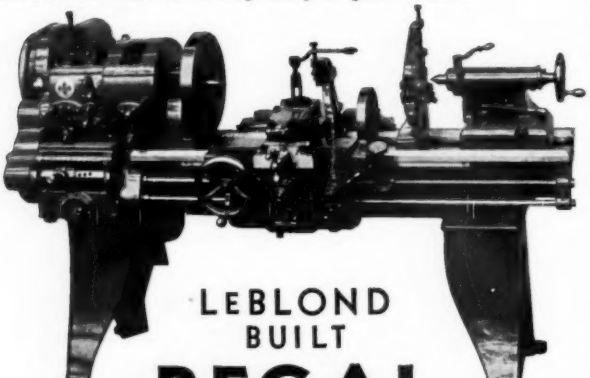
From **Fort Worth, Texas,** we hear that a new establishment, the **Watson-Hill Manufacturing Company** will be located at 404 Kentucky Street. This company manufactures machines for shelling nuts, also machines for grading nuts, fruits, and vegetables. **Ralph G. Watson** and **Cecil C. Hill** are in active charge of the business.

Henry Eggerding of Plainfield, N. J., a **designer of printing press** machinery for **Walter Scott & Company,** died November 18 in Muhlenberg Hospital, Plainfield. He was fifty-eight years old. He attended Rutgers University. Formerly he had been employed as a draftsman by the Pond Machine Tool Company and Ransome Concrete Machinery Company of Plainfield.

E. H. Carlton has **begun the manufacture of house trailers** with all steel frame and chassis. Manufacturing facilities are located at 1106 Hemphill Street, Fort Worth, Texas. Initial plans call for completion of seven trailers per week.

The Handiest Tool *in the* Shop *for* Special *and* Production Jobs

LEBLOND Regal Lathes in 10, 12, 14, 16 and 18 inch sizes, are proving their time, labor and money saving qualities in hundreds of shops for special jobs and as supplemental production equipment. Rugged, durable, sturdy, LeBlond Regals deliver continuous trouble-free service under heavy duty requirements.



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Send today for copy of illustrated Regal Catalog, and information on LeBlond heavy duty lathes.

is a lathe worthy to bear the LeBlond name. Built to the same high standards of quality and performance, subjected to rigid inspection and accuracy tests, Regal Lathes are the outstanding machine tool value in the industry. Every shop can profitably use several Regals.

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20 North Wacker Drive, Chicago 103 Lafayette St., New York
HALF CENTURY OF SERVICE TO INDUSTRY

"LOGAN" LEADS
with MODEL—6035

A COMPLETE LINE OF
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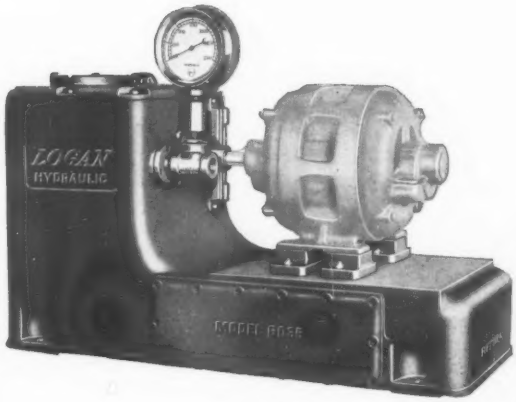
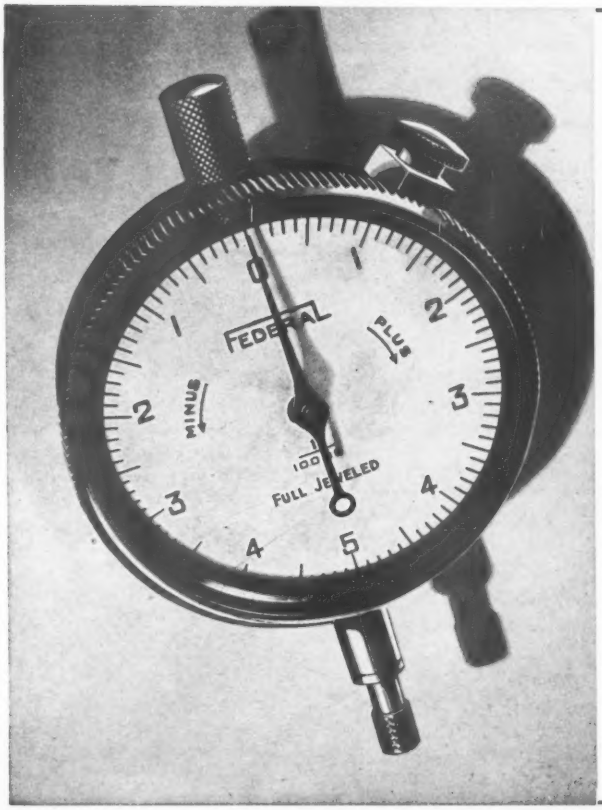


Compact-self-enclosed, sturdy; this new Logan electric hydraulic power device, Model No. 6035 really leads. Economically designed for supplying hydraulic power for the operation of cylinders, chucks clamping devices, forcing presses, etc., where operating cycles are so frequent that no opportunity is given to build up reserve pressure. Manufactured in 4 standard models—2 to 36 gallons per minute, 100 to 1000 pounds pressure—easily attached to all machines. Write for new bulletin.

LOGANSPORT MACHINE INC., LOGANSPORT, IND.



To Overcome INACCURACIES

due to —

—deflection of supporting brackets,

—to gradual variations in work sizes,

—to irregularities of work surface,

—to fast inspection,

USE —

FEDERAL LOW FRICTION
DIAL INDICATORS

Send for Bulletin No. 38

FEDERAL PRODUCTS CORP.
1144 EDDY STREET PROVIDENCE, R. I.

Chicago Muncie Detroit Cleveland New York

Typical of many plant additions and building operations is this new home of the Holo-Krome Screw Corporation in Hartford. The new plant is of brick construction, 200′ x 90′ with saw tooth type roof. Executive offices are located on the second floor, while an adjoining building houses a heat treating department and in another adjoining building the boiler and engine rooms are housed. A steady increase in business of the company made this new plant necessary, an official of the company stated. New Holo-Krome Socket Screw Wrench Sets are now being introduced to the trade.

Russia Doubles Auto Production

(Continued from page 17.)

finest of machine tool equipment available. An example is the gear manufacturing division of the Gorky plant where the latest type of Michigan Lapping Machines are used, while the plant is also standardizing, during the next year, on Michigan Gear Finishers, a number of which have already been installed.

As to general conditions in Russia Mr. Shaw reports remarkable progress during the past year excepting in highway development. Road building, he says, has lagged far behind and possibly will not get under way on a major scale until next spring. Railroads are so over-crowded with freight at the present time that it has been necessary to cut down the number of trains in passenger service.

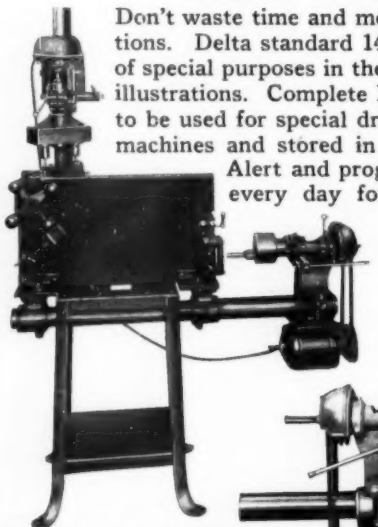
In addition to the adoption of the merit system of wage compensation other significant social trends in Soviet Russia today include the following: anyone may own two homes (including one summer cottage), all limits on the size of interest bearing savings accounts have been removed, anyone may purchase interest bearing government bonds, etc. Strides made along educational lines are quite startling, according to Mr. Shaw, particularly along the lines of higher education. This has been facilitated by the type of program adopted by the government under which any boy or adult, if he is mentally acceptable can go to college with the government paying his railroad fare, board and tuition and providing him with spending money during his college years.

LANGELIER MANUFACTURING CO., of Providence, R. I., have appointed Sterling-French Machinery Co., as their exclusive agents in the Detroit territory, on Drilling Units, Special Machines, Swaging Equipment, etc.

You can tell a big man. He sometimes notices people who can't possibly do him any good.

HOW TO SOLVE YOUR SPECIAL SET-UP PROBLEMS

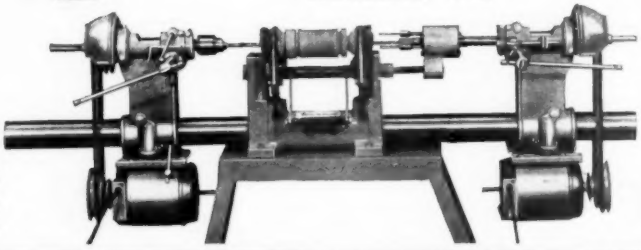
WITH "DELTA" DRILL PRESS HEADS

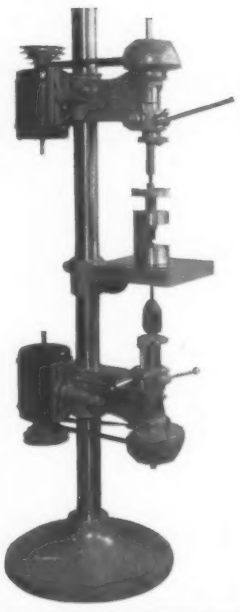


Don't waste time and money building drilling units for special operations. Delta standard 14" drill press heads can be used for hundreds of special purposes in the production shop, such as those shown in the illustrations. Complete Delta drill presses, too, are priced low enough to be used for special drilling operations, rigged up as single-purpose machines and stored in the toolroom when not in use on the line. Alert and progressive tool designers are finding more uses every day for these high-grade, self-sealed ball bearing heads and drills. Send for literature completely describing Delta Drill Presses.

DELTA MFG. CO.

611 E. Vienna Ave.
Milwaukee, Wis.





Note that we furnish only standard drill presses and drill press heads. We do not build special machines.

GEARS

In Stock -- Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send us your blue prints and inquiries.

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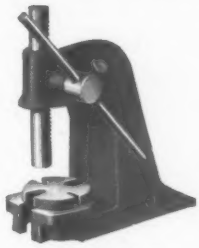
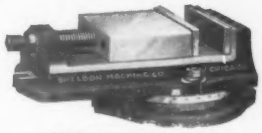
SHELDON

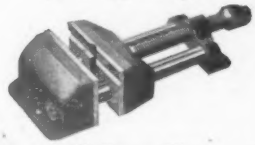
ARBOR PRESSES and VISES



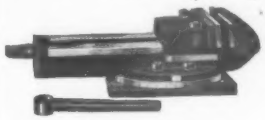
Arbor Presses
12 Sizes
From ¾ to 10 ton Pressure



Plain and Swivel Milling Machine Vises
4 Sizes
3½ to 8½ inch Jaws



Drill Press Vises
3 Sizes
4½ - 6½ and 9 inch Jaws



Shaper Vises
2 Sizes
12 and 14 inch Jaws

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Catalog and Price List

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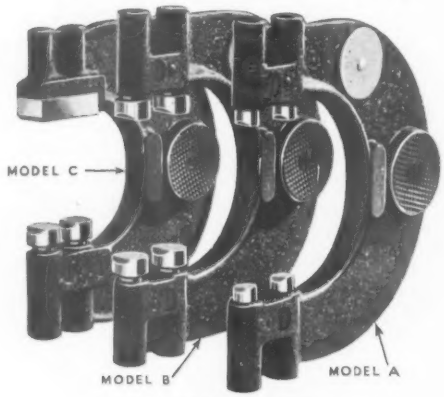
ADJUSTABLE LIMIT SNAP GAGES



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Manufacturers of

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Remember the Advantages of Broaching

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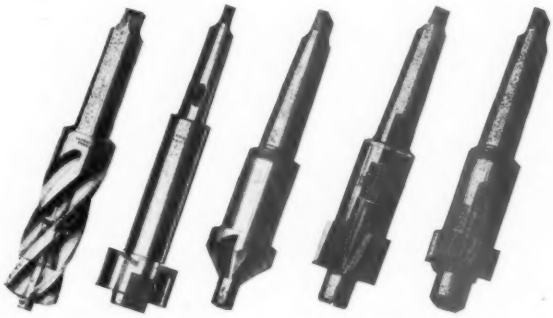
Standard Gairing Cutting . Tools and Tool Holders .

All Gairing Tools are of the highest standard and quality that engineering research, mechanical skill, proper heat treatment, proper materials and modern equipment can produce. In addition to standard cutting tools and holders, many distinctive and individual special tools for intricate operations are manufactured. Standard tools are carried in stock, ready for immediate shipment.



The design of these tools and mechanical principles are based on practical experience and knowledge of the varied conditions under which counterboring is done. We can meet all your regular and special needs for counterboring and spotfacing tools.

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"HOPKINS" PREFERRED EQUIPMENT *for* Drill Presses

AIR OPERATED DRILL PRESS FIXTURE

10" diameter Cylinder, 10" diameter Chuck, 3-1⅛" hole.

This is only one of the many types of clamping equipment which we are constantly designing and manufacturing. Why not submit your problems of compressed air clamping equipment to us?

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MODERN COLLETS are made of a special steel and have a hard, long-wearing surface with a tough, springy core. They are guaranteed accurate in design and taper is ground true with the hole. The deeper, better formed corrugations insure positive gripping. Locking fingers and shoes will last longer, and MODERN COLLETS exert far less strain on chucking cam and chucking cam roller pin.

Write for our catalog on feed-fingers, cams, shaving tools and other screw machine parts.

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FLEXIBLE SHAFT MACHINES

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Type M7A—1½ H.P.

Lathe-Planer and Shaper Grinding Machines

Screw Driving and Nut Setting Machines

Machines Portable Reaming Machines

Die Grinding Machines and Attachments for Sanding Drilling Buffing Wire Brushing Rotary Filing and many other operations.

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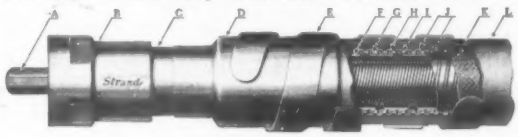

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EASILY-CLEANED. The case stem of the Ames Shockless Gauge can be easily unscrewed, the lower half of the spindle withdrawn for cleaning and the assembly replaced without otherwise disturbing the gauge. For details of other exclusive features, send for the Ames Gauge catalogue.

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GRIPS AS STRONG AS SOLID STEEL

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FOR END MILLS

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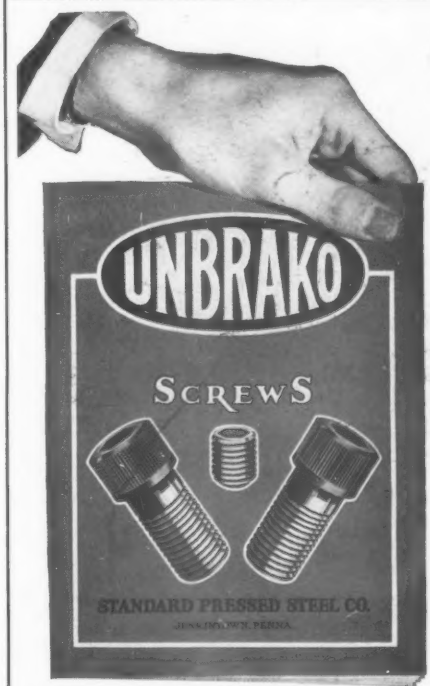

You should have a copy of this Catalog

There's a lot of valuable data in it—about "Unbrako" Hollow Set Screws and "Unbrako" Hollow Head Cap Screws, Stripper Bolts etc., as well as considerable general technical information.

A copy is yours for the asking.

STANDARD PRESSED STEEL CO.

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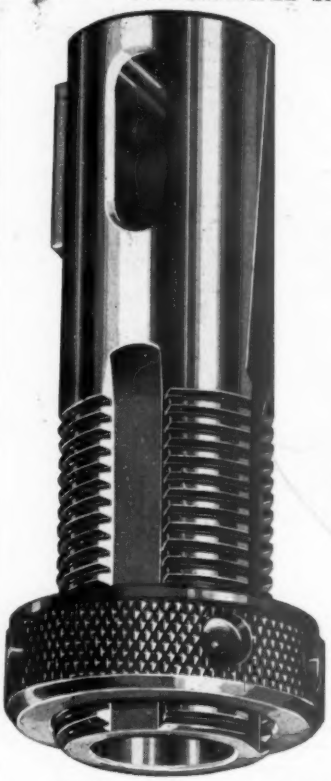
FOR MULTIPLE SPINDLES



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